

ECOLOGGY

2000 Annual Wildlife Monitoring Report for the Rocky Flats Environmental Technology Site



ADMIN RECORD

**2000 Annual Wildlife Survey for
the Rocky Flats Environmental
Technology Site**

Kaiser-Hill, LLC
Rocky Flats Environmental Technology Site
Golden, Colorado 80402-0464

June 2001

Contents

	<u>Page</u>
List of Figures	v
List of Tables	vii
Acronyms and Abbreviations	ix
Executive Summary	ES-1
1 Introduction	1
1.1 Background	1
1.2 The Natural Resource Compliance and Protection Program	1
2 Methods	5
2.1 Data Collection	5
2.1.1 Significant Species Data Collection	5
2.1.2 Migratory Bird Surveys	7
2.1.3 Protected Species Surveys (Preble's Meadow Jumping Mouse)	8
2.2 Data Analyses	9
2.2.1 Multi-Species Census Data Analyses	9
2.2.2 Significant Species Area Use from Sitewide Survey Data Analyses	10
2.2.3 Fish Sampling Data Analyses	10
2.2.4 Amphibian Monitoring Data Analyses	10
2.2.5 Bird Community and Species Density Analyses	10
2.2.6 Preble's Meadow Jumping Mouse Data Analyses	11
3 Results and Discussion	13
3.1 Significant Species	13
3.1.1 Big Game Mammals	13
3.1.2 Lagomorphs and Large Rodents (Sitewide and Multi-Species Surveys)	16
3.1.3 Carnivores (Sitewide and Multi-Species Surveys)	16
3.1.4 Waterfowl—Ducks, Geese, and Shorebirds (Sitewide and Multi-Species Surveys)	17
3.1.5 Raptors (Sitewide and Multi-Species Surveys)	18
3.1.6 Fish Sampling	19
3.1.7 Herpetiles (Reptiles and Amphibians)	20

3.1.8	Special-Concern Species	21
3.2	Migratory Birds	26
3.2.1	Bird Relative Abundance from Multi-Species Census Surveys	27
3.2.2	Migratory Bird Survey Summaries	28
4	Conclusions	31
5	References	33

Figures

Tables

Appendix A Data Entry Codes for Significant Species Data

Appendix B 2000 Preble's Meadow Jumping Mouse Study at the Rocky Flats Environmental Technology Site

List of Figures

- Figure 1-1 Location of the Rocky Flats Environmental Technology Site
- Figure 2-1 Grid map of Rocky Flats Environmental Technology Site used for location data entry
- Figure 2-2 Locations of multi-species census survey transects
- Figure 2-3 Fish sampling locations in Rock Creek
- Figure 2-4 Boreal chorus frog monitoring locations
- Figure 2-5 Locations of bird survey transects
- Figure 2-6 Locations of Preble's mouse habitat characterization transects
- Figure 2-7 Illustration of quadrat placement for Preble's mouse habitat characterization
- Figure 3-1 Total numbers of mule deer in winter (1994–2000)
- Figure 3-2 Annual mule deer population comparisons from winter counts (1994–2000)
- Figure 3-3 Spring mule deer use areas from combined data 1997–2000
- Figure 3-4 Summer mule deer use areas from combined data 1997–2000
- Figure 3-5 Fall mule deer use areas from combined data 1997–2000
- Figure 3-6 Winter mule deer use areas from combined data 1997–2000
- Figure 3-7 Area use by white-tailed deer in 2000
- Figure 3-8 Comparison of waterfowl species numbers recorded at Rocky Flats annually (1993–2000)
- Figure 3-9 Comparison of raptor species numbers recorded at Rocky Flats annually (1993–2000)
- Figure 3-10 2000 Boreal chorus frog vocalization index frequency summary
- Figure 3-11 2000 Boreal chorus frog vocalization monitoring results
- Figure 3-12 1998–2000 Boreal chorus frog frequency summary
- Figure 3-13 Sequential, within-habitat similarity of June bird species composition
- Figure 3-14 Within-habitat comparisons of 2000 June bird species composition to earlier years

Figure 3-15 Simpson's diversity index calculated for each season for the major habitat types from spring 1994 through winter 2000

Figure 3-16 Demonstration of artificial skewness that favors certain distance categories due to Site survey method

List of Tables

Table 2-1	Multi-species census survey transect descriptions
Table 2-2	Special-concern species search list for the Rocky Flats Environmental Technology Site (effective May 14, 2001)
Table 2-3	Bird survey transect descriptions
Table 2-4	Preble's mouse habitat characterization parameters
Table 3-1	Seasonal mule deer use areas (combined data from 1997-2000)
Table 3-2	White-tailed deer use areas (combined data from 1997-2000)
Table 3-3	Big game relative abundance in spring (1995-2000)
Table 3-4	Big game relative abundance in summer (1995-2000)
Table 3-5	Big game relative abundance in fall (1995-2000)
Table 3-6	Big game relative abundance in winter (1995-2000)
Table 3-7	Lagomorph and large rodent relative abundance (1995-2000)
Table 3-8	Seasonal lagomorph and large rodent area use (1997-2000)
Table 3-9	Seasonal carnivore relative abundance (1995-2000)
Table 3-10	Seasonal carnivore area use (1997-2000)
Table 3-11	Waterfowl relative abundance in spring (1995-2000)
Table 3-12	Waterfowl relative abundance in summer (1995-2000)
Table 3-13	Waterfowl relative abundance in fall (1995-2000)
Table 3-14	Waterfowl relative abundance in winter (1995-2000)
Table 3-15	Seasonal waterfowl area use (1997-2000)
Table 3-16	Raptor relative abundance by season (1995-2000)
Table 3-17	Seasonal raptor area use (1997-2000)
Table 3-18	Boreal chorus frog vocalization index data (1998-2000)
Table 3-19	Herpetile relative abundance by season (1995-2000)
Table 3-20	Seasonal herpetile area use (1997-2000)
Table 3-21	Bird distribution by habitat based on observations from 1991, 1993-2000
Table 3-22	Migratory bird relative abundance in spring (1995-2000)

- Table 3-23 Migratory bird relative abundance in summer (1995–2000)
- Table 3-24 Migratory bird relative abundance in fall (1995–2000)
- Table 3-25 Migratory bird relative abundance in winter (1995–2000)
- Table 3-26 Jaccard index of June bird species composition, expressed as percent similarity, comparing the three major habitat types from 1994–2000
- Table 3-27 Simpson's diversity index $[1 - \sum ((n*(n-1))/N*(N-1))];$ TWS 1980] for seasonal bird communities in the three major habitat types from 1994–2000

Acronyms and Abbreviations

BEPA	Bald and Golden Eagle Protection Act
BZ	Buffer Zone
CDOW	Colorado Division of Wildlife
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CNHP	Colorado Natural Heritage Program
CWA	Clean Water Act
DOE	U.S. Department of Energy
DOE, RFFO	DOE, Rocky Flats Field Office
ESA	Endangered Species Act
FNWA	Federal Noxious Weed Act
FWCA	Fish and Wildlife Coordination Act
IMP	Integrated Monitoring Program
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NRCPP	Natural Resource Compliance and Protection Program
NTECA	Colorado Nongame, Threatened and Endangered Species Conservation Act
o/m	observations per minute
PIT	Passive Integrated Transponder
Site	Rocky Flats Environmental Technology Site
USFWS	U.S. Fish and Wildlife Service

Executive Summary

The Natural Resource Compliance and Protection Program monitors the status of wildlife, plant communities, and habitats to ensure that operations at the Site remain in compliance with state and federal wildlife protection statutes and regulations, and with U.S. Department of Energy orders. Other goals of the program are to collect sufficient data to provide a scientific basis for natural resource management decisions in keeping with established policies for the management of the Site, provide a basis for National Environmental Policy Act decision documents, and ultimately to provide data in defense of natural resource damage assessments upon completion of Site closure actions.

Species monitored under this program include big game mammals, large rodents and lagomorphs, migratory birds, carnivores, waterfowl, raptors, fish, herpetiles (reptiles and amphibians), and special-concern species. No remarkable changes in population estimates, census data, monitoring results, or relative abundance of the species, or other measures, were discovered through monitoring efforts in 2000. All data indicate that the majority of the ecosystem in the outer portions of the Site (the Buffer Zone) is not influenced substantially by actions within the Industrialized Area of the Site. As long as these habitats and plant communities remain undisturbed, and reasonable and prudent management actions are taken to maintain the health of the ecosystem, no significant adverse effects are likely to result from current Site operations.

New species recorded in 2000 included species from several different taxa. One new bird species, the broad-winged hawk, was recorded on the Site in 2000. The list of species continues to increase by a few new species each year as long as qualified observers remain afield.

The most common big game species at the Site is the mule deer. The current population at the Site is estimated to be approximately 160 individuals. White-tailed deer numbers have increased, and there are more than a dozen individuals of this species that use the Site with regularity. The age class breakdown continues to indicate a fawn survival rate of approximately one fawn for every two does (1:2). The number of fawns recorded in the year-end census (41) was equal to the mean of the winter fawn counts over the past six years. The doe-to-buck ratio continues to be very low (1.5:1), providing excellent breeding opportunity, and contributing to the stability of the Rocky Flats herd. Overall annual mule deer relative abundance of 0.149 observations per minute of survey (o/m) remained similar to previous years' data.

The most frequently observed carnivore species at the Site is the coyote, and the next is the raccoon. Coyotes, which are active both diurnally and nocturnally, were found in all habitats. Annual sitewide relative abundance for coyotes has averaged 0.009 o/m over the past three years.

The presence of several mammalian carnivore species, the top species in the food chain, is an indication of the good ecological condition of the Site. While this program does not attempt to track the actual numbers of all carnivores at the Site, the evidence of a steady coyote population over time is a good indication that prey species continue to be abundant. The top carnivores in

an ecosystem must have a large, healthy population of prey species upon which to subsist. Reduced numbers of prey species are normally reflected in reduced abundance and species richness of carnivores.

A total of 25 waterfowl species was observed during sitewide significant species surveys and multi-species census surveys. This number is somewhat lower than the eight-year mean of 28.6 species per year, but waterfowl records are very dependent on weather patterns, and one-day snapshots can be significantly different from year to year for the same date. A difference in timing of surveys by a day or two can yield extraordinary differences in numbers and migrating species present. Seasonal assemblages of waterfowl species remained similar to previous years, with some previously observed species not recorded during 2000, and other species reappearing after an absence from observation. This is not unusual with migratory species.

Raptor species exhibited their normal species richness and seasonal species assemblages. As in past years, red-tailed hawks, Swainson's hawks, American kestrels, and great horned owls nested in appropriate habitat across the Site, demonstrating that the habitat continues to provide the necessary resources for these species.

Fish sampling produced limited results because of low to nonexistent streamflow. In ephemeral headwaters streams such as exist at the Site, this is a normal occurrence. Seasonal drought limits the species richness for fish, and limits development of the aquatic ecosystem in general in this semi-arid locale.

In 2000, boreal chorus frogs were found at more locations than in either 1998 or 1999. The number of locations where boreal chorus frogs were observed in the south Buffer Zone increased dramatically in 2000 compared to 1998 and 1999. The mean vocalization index value fell between those observed in 1998 and 1999, suggesting that no substantial changes in the boreal chorus frog populations at the Site had occurred. The data indicate the continued presence and high abundance of boreal chorus frogs at the Site.

Preble's meadow jumping mouse monitoring in the Woman Creek drainage indicated that Preble's mice were using the entire drainage from the west boundary of the Site to Pond C-2. There is no evidence that the Woman Creek population has changed since it was last surveyed in 1997. Based on telemetry data, home range estimates ranged from 1.6 to 5.9 ha (4 to 15 acres). This data has added breadth to the Rocky Flats database on the mouse, and has helped Site ecologists further refine the site-specific habitat model for Rocky Flats.

Migratory birds have shown various trends depending on season and monitoring methodology. Using multi-species census survey data to determine relative abundance showed that several species, though still in the top 10 most abundant species, were in a slightly different order of abundance than in some previous years. This variability is not unexpected in migratory species. During 2000, 80 bird species were recorded on migratory bird surveys alone. Over the past 10 years, 153 of these have been recorded on migratory bird transects. This compares to a sitewide species richness of 189 species that have been recorded by all methods over the past 10 years. Site data appear to reflect regional trends in grassland species, which are generally in decline. They also show the result of continued observation of uncommon species (though low numbers of individuals), which has increased calculated diversity in wetlands over time.

The long-term, year-round ecological monitoring program conducted under this program continues to be an essential tool for identifying, describing, and quantifying fluctuations in wildlife populations, wildlife habitat use, and changes in the species that use the Site as year-round or seasonal habitat. Wildlife population densities vary constantly with natural pressures, and only well-integrated, long-term monitoring such as this can identify consequences of natural influences versus consequences of human activities. The data produced are an invaluable tool in predicting and avoiding ecological impacts resulting from projected human activities. Monitoring results can also guide the natural resource management decision-making process such that it continues to accomplish the goals of the Site's natural resource management policies. The continued development of this long-term database will provide a solid basis for defense against natural resource damage claims in the future, as well.

If sensitive species dwindle in numbers or disappear, a serious environmental health problem may be indicated. Monitoring and surveys such as those carried out under this program can detect trends of this sort, and act as an "early warning system" for impending ecological problems. This function will become increasingly important as remediation activities at the Site increase, and will play an essential role in assessing natural resource damages.

1 Introduction

1.1 Background

Rocky Flats Environmental Technology Site (the Site) is a U.S. Department of Energy (DOE) nuclear industrial facility that has been part of the nationwide nuclear weapons complex since 1951. The Site is located in semi-rural Jefferson County, Colorado, approximately 16 miles northwest of Denver, and 5 miles southeast of Boulder. The Site covers approximately 6,262 acres, of which approximately 5,900 acres forms an undeveloped Buffer Zone (BZ) around the central industrialized portion. The original 1951 land purchase included approximately 2,520 acres of rangeland, which was expanded by an additional 4,030 acres from private ranches in 1974 (some 290 acres were later allocated to the National Renewable Energy Laboratory). The Site adjoins undeveloped rangelands that are encroached by housing developments and commercial properties on the northeast and southeast. To the north, east, west, and northwest, public open-space lands border the Site. Figure 1-1 presents the general location of the Site.

The original mission of this DOE facility was the manufacture of nuclear weapons components. With the end of the Cold War and cessation of nuclear weapons production at the facility, the Site is currently undergoing cleanup and closure. During the next seven years, buildings will continue to be demolished, and disturbed areas will be planted back to native prairie. One of the current DOE goals is to preserve the Site's unique ecological resources. Certain natural resource protection goals are identified in the Natural Resource Management Policy issued by DOE in 1998 (DOE 1998). Ecological monitoring is necessary to ensure regulatory compliance, to attain DOE's natural resource protection goals, and to preserve and protect these unique ecological resources to the maximum extent possible during cleanup and closure. The Natural Resource Compliance and Protection Program (NRCPP) provides for such ecological monitoring.

1.2 The Natural Resource Compliance and Protection Program

The NRCPP monitors the status of plant communities, wildlife, and habitats to ensure that operations at the Site remain in compliance with state and federal wildlife protection statutes and regulations, and with DOE orders. Other goals of the program are to collect sufficient data to provide a scientific basis for National Environmental Policy Act (NEPA) documentation and to support cleanup and closure of the Site.

The regulatory drivers for NRCPP wildlife and habitat work include:

- The Endangered Species Act (ESA) (USC 1973b)
- The Fish and Wildlife Coordination Act (FWCA) (USC 1958)

- The Migratory Bird Treaty Act (MBTA) (USC 1973a)
- The Bald and Golden Eagle Protection Act (BEPA) (USC 1978)
- The National Environmental Policy Act (USC 1970)
- The Clean Water Act (CWA) (USC 1977)
- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (USC 1980)
- The Federal Noxious Weed Act (FNWA) (USC 1975)
- CFR Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements (CFR 1979)
- CFR Part 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements (CFR 1979)
- CFR Part 230, 404(b)(1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material (CFR 1980)
- The Colorado Nongame, Threatened and Endangered Species Conservation Act (NTECA) (CO 1991)
- Executive Order 11990, Protection of Wetlands (EO 1977a)
- Executive Order 11988, Floodplain Management (EO 1977b)
- Colorado Weed Management Act, Undesirable Plant Management (CO 1984)
- Jefferson County Undesirable Plant Management Plan (JeffCo 1991)
- DOE Order 4300.1B, Real Property Management (DOE 1989a)
- DOE Order 6430.1A, General Requirements, Construction Facilities and Temporary Controls (DOE 1989b)
- DOE Order 5400.1, General Environmental Protection Program (DOE 1988).

Since the NRCPP was established in 1992, Site ecologists have conducted routine surveys to monitor the health and populations of high-visibility and sensitive wildlife groups such as migratory birds, game species, indicator organisms (e.g., raptors and amphibians are groups that are more sensitive to contaminants and stress), and species that are afforded special protection by federal and state statutes. The methods used are set forth in the Site's standard operating procedures, *EMD Operating Procedures Manual Volume V* (DOE 1994a), and the 2000 Ecology Field Sampling Plans (K-H 2000a). Continuation of this program as a long-term monitoring program has provided a continuous record of these selected species that can be compared among years. These long-term surveys were the basis of Chapter 5, Ecological Monitoring, of the *Rocky Flats Environmental Technology Site Integrated Monitoring Plan*

(IMP) (K-H 1999). Each year, the IMP is reviewed, and special sampling and monitoring may be added to address specific questions or additional data needs. This ongoing monitoring program is an important environmental management tool for DOE, Rocky Flats Field Office (RFFO) and its contractors. Data from these surveys, which are stored in the Site Ecology Database, have been used in the preparation of compliance documents, environmental evaluations, remediation plans, environmental assessments, environmental impact statements, categorical exclusions, and project planning documents. These data are also used to make ecological resource management decisions to ensure the preservation of these resources at the Site.

Routine monitoring provides data on habitat affinities of sensitive species, which can then be used to predict the presence or absence of such species within planned work areas, avoiding the expense of additional special surveys. Availability of such information allows timely assessment of proposed actions for potential ecosystem impacts, thus reducing project delays. These data are therefore a valuable planning tool that can help avoid conflicts between project scheduling and protective regulations. Monitoring also provides data for management decisions under the *Ecological Resource Management Plan* (K-H 1997a). Continued monitoring of wildlife populations at the Site will also provide valuable background data for addressing CERCLA-related Natural Resource Damage Assessment (NRDA) concerns in the future.

The NRCPP ecological monitoring program also supports documentation and protection of threatened and endangered species to comply with the ESA and NTECA, and addresses migratory bird protection concerns under the MBTA at the Site. The NRCPP project-specific surveys are performed in work areas before such activities as construction, mowing, assessment, remediation, and other projects start, and are instrumental in keeping Site activities in compliance with the acts and regulations listed above. Site-specific monitoring also provides data continuity with routine monitoring results.

A long-term ecological monitoring program such as the NRCPP ecological monitoring program plays an essential role in identifying fluctuations in wildlife populations, wildlife habitat use, and changes in the species that use the Site as year-round or seasonal habitat. Wildlife population densities vary because of natural pressures, and only long-term monitoring can identify "real" changes that are the consequence of either natural fluctuations or human influences. This information is essential for effective ecological resource management at the Site. The NRCPP also has the flexibility to add special surveys as needed for specific projects. Existing data in the database can then be combined with results from special surveys and analyzed to answer specific questions on ecological concerns. Availability of accurate, up-to-date ecological data is essential for planning long-term cleanup strategies. Additionally, advance knowledge of ecological concerns can help to avoid or minimize natural resource injury, thereby reducing liability for natural resource damages, and establishing further credibility with regulators and the private sector.

Protection procedures and plans (DOE 1994b,c, 1997) developed by and implemented through the NRCPP aid ecologists in assessing potential impacts to threatened, endangered, and special-concern species, as well as migratory birds and wetlands, all of which enjoy special protected status. Surveys performed in compliance with these procedures ensure that wildlife and

wetlands are protected, and that state and federal wildlife and habitat protection statutes are not violated during Site activities.

The purpose of this ongoing, long-term monitoring program is to monitor the population trends and general health of the Rocky Flats ecosystem. The landscape-level monitoring approach, that of monitoring the entire Site as a single ecosystem unit, provides the appropriate level of information required for effective natural resource management at the Site. This landscape approach allows analysis of large habitat areas and site-wide trends, so that the effects of general Site operations can be assessed and management actions can be identified. Because most groups monitored include highly mobile species, this large-scale monitoring approach is necessary to provide more complete information on population and use trends. Smaller scale monitoring would create data gaps when target species move from sampling areas. Many species, or groups of species, use the entire Site or cross from one major drainage basin to another during various seasons, indicating that contiguous habitat units are of greater importance than drainage divides or artificial administrative divisions on the Site. Establishing artificial boundaries for monitoring would, therefore, limit data utility.

This report summarizes the results from wildlife surveys performed during 2000. Many survey techniques were used to determine populations and habitat use of wildlife species at the Site. The methods are outlined in the following section, and summaries of survey results for each major wildlife group monitored are presented in subsequent sections.

2 Methods

Site ecologists use several methods to monitor the presence of wildlife, habitat use, seasonal residence, species densities, breeding areas, and other pertinent wildlife parameters. Significant species observations are recorded by grid location (Figure 2-1), whether observed during the sitewide significant species survey, multi-species census surveys, or migratory bird surveys: Multi-species census surveys, performed on established transects, record all wildlife observed. Monthly sitewide surveys along established roads over the entire Site record all significant species. Project-specific work-area surveys record the presence or absence of any special-concern species and confirm the presence and/or locations of wetlands within project areas. Migratory bird surveys record bird species along established transects. A limited fish sampling effort and an amphibian vocalization survey were added into the program in 1998. In addition to these formal surveys, fortuitous sightings of any significant species are recorded (these may occur during the above surveys).

2.1 Data Collection

2.1.1 Significant Species Data Collection

Significant species are species of special interest because of their status as high-visibility species, indicator organisms, sensitive species, federal and state protected species, or game species. Significant species groups include waterfowl, big game mammals, game birds, carnivores, raptors (birds of prey), small game mammals, furbearers, and selected other species. When observations of significant species are made, location data are recorded by grid-cell code (Figure 2-1). The alphanumeric grid-cell locator code (e.g., 12H) provides a location to within 1,000 ft of the observation. A list of species currently designated as significant is presented in Appendix A.

2.1.1.1 Multi-Species Census Surveys

Multi-species census surveys are performed monthly on 16 established survey routes, allowing long-term data collection on survey transects included in the NRCPP ecological databases. Monthly performance of these surveys allows collection of data to characterize habitat and area use and estimate the relative abundance of significant species year-round. Transect routes vary in length (generally at least a mile) in all major habitat types at the Site. The major habitats recognized at the Site include wetlands, riparian (streamside) woodland, riparian shrubland, tall upland shrubland, mesic mixed grassland, xeric mixed grassland, and reclaimed grassland. Table 2-1 presents a list of transects and habitat descriptions for the multi-species surveys. See Figure 2-2 for transect locations.

Multi-species census surveys are performed in accordance with procedures described in the *EMD Operating Procedures Manual Volume V* (DOE 1994a). Surveys are performed by a qualified ecologist who walks established transects in specific habitats and records data for all

animal species observed during the survey. Multi-species census surveys are designed to collect data on species richness, species abundance, area use, and habitat use. Data recorded include species, number of individuals, habitat, activities, age and sex classifications, and other pertinent information. Additionally, the habitat use per minute of observation time is recorded. These data provide information on what habitats were used by which species, how often, and for what purposes.

2.1.1.2 Sitewide Significant Species Surveys

Sitewide significant species surveys are conducted monthly along all main roads in the BZ. Preference is given to fair weather to optimize observation ability and driving conditions. During these surveys, all visible individuals of significant species observed during a short time span (i.e., 3 to 4 hours) over the entire property are recorded. These surveys are performed diurnally (during the day) and nocturnally (during the night).

In 2000, diurnal sitewide surveys were performed monthly, except in September, when the monthly survey was nocturnal (dusk to midnight). The nocturnal survey method provides coverage over the entire BZ in areas that can be seen with the beams of hand-held spotlights. The primary purpose of the nocturnal survey is to document the presence of nocturnal species that are rarely observed during daylight hours.

2.1.1.3 Fish Sampling

In 2000, fish sampling was performed only in Rock Creek, although all streams had been slated for sampling. Figure 2-3 shows locations sampled in Rock Creek. The lack of water in the ephemeral streams on the Site severely limited areas where sampling could be performed. Sampling of riffle areas had been the target for 2000, but the riffles were largely dry.

Traps remained at each location for a minimum of two days and were checked by afternoon of each day. Any aquatic or semi-aquatic vertebrates captured in the traps were identified and enumerated before being released.

2.1.1.4 Amphibian Monitoring

As a taxonomic group, the frogs and toads at the Site are recorded only occasionally during normal wildlife monitoring. Until vocalization monitoring was instituted in 1998, most observations of amphibians had been fortuitous. Although this approach provided an annual presence/absence record for these species at the Site, the lack of a repeatable monitoring method prevented effectively tracking population abundance or the distribution of these species on Site. Because such information can provide additional insight and act as an additional tool for detecting changes in the health of the Site aquatic ecosystems, monitoring for these species has been instituted. Amphibians are an important group to track, because their semi-aquatic nature makes them particularly sensitive to aquatic impacts (Blaustein 1995).

The methods used for the amphibian vocalization surveys in 2000 generally followed the guidelines provided by Mossman (1998). Additional information used for the surveys was taken from the Wisconsin Department of Natural Resources (Mossman and Hine 1984, 1985)

and the National Biological Survey (NBS 1997). Some modification of these guidelines was necessary to adapt the surveys for use at the Site.

A total of 20 locations were sampled for species presence/absence and population abundance in 2000 (Figure 2-4). This approach followed the modifications of the protocol implemented in 1999 (K-H 2000b). The 20 locations were divided almost evenly between the north and south Buffer Zone areas (using the east and west access roads as the dividing line between north and south). Eleven sites were in the north Buffer Zone, and nine were in the south Buffer Zone. Monitoring was conducted in the north and south Buffer Zone on two separate nights, starting at dusk, to keep the total sampling time each evening within two hours of sunset. In 2000, surveys were conducted in the north Buffer Zone on April 28 and the south Buffer Zone on May 1.

Vocalizations were categorized into indices as designated in the 2000 field sampling plans (K-H 2000a). Additional information recorded at each survey location included air temperature (°C), water temperature (°C; where feasible), wind speed, cloud cover, precipitation, and noise interference.

2.1.1.5 Project-Specific Special-Concern Species and Wetland Surveys

Special-concern species are a particular class of wildlife and plants that are of special interest at the Site because of their protected status or rarity. These species have been designated on the basis of their rare or imperiled status, as identified by the U.S. Fish and Wildlife Service (USFWS), the Colorado Division of Wildlife (CDOW), the Colorado Natural Heritage Program (CNHP), and other interested groups. Species placed in this category by the NRCPP are federally listed threatened and endangered species; species proposed by the USFWS for listing; species formerly listed by the USFWS as candidate species; Colorado threatened, endangered, or Species of Special Concern; species from the CNHP lists of rare and imperiled species; and species that are "watch-listed" by other regulatory or natural resource conservation groups. Special-concern species tracked by the NRCPP are listed in Table 2-2. The NRCPP monitors the presence, locations, and numbers of these species within project areas to better ensure the Site's compliance with the applicable acts and regulations, and to provide appropriate protection for these species. If species of specific regulatory concern are found to be present in a project area, specific protection or avoidance plans are developed. When federally listed species will be affected, these surveys provide the basis for informal or formal consultation under the Endangered Species Act.

Project-specific surveys for special-concern species are performed in accordance with the ecology procedures 1-D06-EPR-END.03—threatened and endangered species protection (DOE 1994b), 1-G98-EPR-END.04—migratory bird protection (DOE 1994c), and 1-S73-ECOL-001—wetland protection (DOE 1997). Locations for project-specific surveys are determined by the work plans for construction, assessment, and remediation projects.

2.1.2 Migratory Bird Surveys

Migratory bird species richness and population density data were collected along 20 permanent survey routes (transects) established in all major habitats at the Site. Surveys of these transects

were performed monthly by a qualified ecologist who walks the established routes and records data for bird species encountered along the survey belt. Table 2-3 lists survey routes and general habitat types for each transect. Figure 2-5 shows the locations of these routes. Migratory bird surveys collect habitat use and population data for all bird species in different habitats within the BZ. Breeding bird surveys collect the same data as monthly surveys, but are conducted at closely spaced time intervals (weekly) during early summer to provide greater detail on the breeding season. Monthly surveys were performed during the remainder of the year. Migratory bird surveys were performed in accordance with the *EMD Operating Procedures Manual* (DOE 1994a).

2.1.3 Protected Species Surveys (Preble's Meadow Jumping Mouse)

2.1.3.1 Trapping Methods

Trapping of Preble's meadow jumping mice and other small mammals follows the procedures outlined for small mammals in the *EMD Operating Procedures Manual Volume V* (DOE 1994a) and conforms to the U.S. Fish and Wildlife Service *Interim Survey Guidelines for Preble's Meadow Jumping Mouse* (USFWS 1999). Small mammal field efforts in 2000 concentrated on studying Preble's meadow jumping mouse (*Zapus hudsonius preblei*) populations in Woman Creek. Early and late trapping sessions were conducted. See Appendix B for a detailed description of the methods used during this trapping program.

The objectives of the 2000 study effort were to estimate population size, location, and demographics of Preble's mice in the Woman Creek watershed via a mark-recapture trapping effort. Individual mouse movement/behavior was also tracked through the use of radio telemetry. An additional component of this monitoring effort was to characterize Preble's mouse habitat along Woman Creek in a way that would be more comparable to other studies in Colorado.

Data for each small mammal captured included species, age, sex, and breeding condition. Each Preble's mouse was measured for key identifying characteristics and examined for identification marks to determine whether it had been captured previously or was a new individual. Each individual Preble's mouse captured was marked with a Passive Integrated Transponder (PIT) tag. During subsequent recapture efforts, all Preble's mice were scanned with the PIT tag reader.

2.1.3.2 Radio Telemetry Methods

Adult Preble's mice were fitted with radio collars until the supply of collars ran out. Telemetry tracking began as soon as the first mouse was collared. Collared mice were tracked at night during the first session, and during the day through the second session, because previous telemetry results have shown that individuals travel much less as their hibernation time approaches. Methods are described in Appendix B.

Locations of collared individuals were estimated by triangulation from the previously established waystations. Compass bearings were taken from three to five waystations per

triangulation, with the last bearing being taken within an hour of the first. Each bearing set was checked for polygon closure using a QBASIC program. If closure failed, the set was discarded and a new set was taken from a different group of waystations, if possible.

Locations of individuals were estimated a minimum of twice per 24-hour period for the life of the transmitter. Once a week during the day, transmitter signals were followed directly to the individual, so that a visual determination of the well-being of the individual could be made.

2.1.3.3 Habitat Characterization

Ten transects for Preble's mouse habitat characterization were located randomly between the western boundary fence and Pond C-2 (Figure 2-6). Transects were 50 m in length, starting at the stream bank and extending perpendicularly out from the stream channel. Five transects were placed on the south side and five on the north. The collective width of the stream channel and the riparian vegetation was measured at the location of each transect.

Five 1-m² quadrats were placed along each transect at the 0-, 5-, 15-, 25-, and 50-m points, on the right-hand side facing away from the stream (Figure 2-7). At each quadrat, physical and vegetation parameters were measured (Table 2-4). Physical parameters included slope angle, slope aspect, slope position, moisture gradient, soil texture, and distance to canopy edge. Vegetation parameters included species richness dominant associations; canopy species; herbaceous density; and estimates of percent tree, shrub, short shrub, graminoid, and forb cover. Measurements using a spherical densiometer for tree and shrub cover were made from the center of the quadrat in the four cardinal directions at a height of 1 m. Herbaceous density was measured using a vegetation profile board (1 m² graduated by decimeters; after Nudds 1977), read at a distance of 10 m and a height of approximately 1-m. Visual estimates of tree, shrub, short shrub, graminoid, and forb cover within the quadrat were made using a cover class system: 1 = <5%, 2 = 6-25%, 3 = 26-50%, 4 = 51-75%, and 5 = >76%. Methods are described in Appendix B.

2.2 Data Analyses

As standard practice, data entry into the Ecology Database is verified and validated to ensure accuracy before data analysis is performed. Corrections are made to entered data as required, and all summary tables used for data analysis are based on the quality-assured data (K-H 1997b).

2.2.1 Multi-Species Census Data Analyses

The Ecology Database was queried to determine the habitat use preferences of each species of interest and the relative abundance of those species. Summary tables for species and/or species groups were then prepared, and the percentages of observations in each habitat were compared to determine habitats of major importance to individual species or species groups, and to determine the relative abundance of those species.

Relative abundance, expressed as observations per minute (o/m), is a means of comparing the abundance of a particular species to itself over time, or comparing relative abundance of one species to another. These comparisons can be made within a single habitat, or a single season, over the entire Site by season or by year. By comparing relative abundance, one can determine how common (or relatively abundant) a species is in specific habitats by season or by year, and how common each recorded species is site-wide. A comparison of relative abundance over time can provide specific information on long-term population trends. While relative abundance cannot provide absolute population numbers, the relative abundance of species provides trending information. For example, when results for a given species are compared year to year (e.g., mule deer relative abundance of 0.201 observations per minute [o/m] in Year A compared to 0.119 o/m in Year B, would show a decline in relative abundance) a trend in relative abundance will indicate a trend in the population of that species. Further, if mule deer are recorded at a rate of 0.119 o/m, and turkey vultures are recorded at a rate of 0.0002 o/m, the data show that mule deer are more abundant than turkey vultures. Observations per minute of a species in a given habitat compared to observations per minute of that species in another habitat can provide information on the habitat affinities of that species. Each type of information is valuable in determining management strategies for either individual species, or for different habitats, depending on the management need.

2.2.2 Significant Species Area Use from Sitewide Survey Data Analyses

Area use summaries were derived by querying the sitewide significant species survey data in the Ecology Database for grid points from observations of each species. Figure 2-1 shows the grid used to record location data. Summary tables were then prepared to facilitate data analyses for each major species group.

2.2.3 Fish Sampling Data Analyses

Analyses for these semi-quantitative sampling methods were limited to enumeration of species identified for the limited data collected in 2000 (i.e., species richness).

2.2.4 Amphibian Monitoring Data Analyses

Data were summarized for boreal chorus frog occurrence frequency and vocalization indices. In addition, a map was prepared showing where the species was documented on the Site in 2000.

2.2.5 Bird Community and Species Density Analyses

Avian species composition between the major habitat types and over the years were compared using the Jaccard Similarity Index (Digby and Kempton 1987). Only surveys taken during June were used, and only from the years 1994–2000, to maximize comparability.

Simpson's Index of Diversity (TWS 1980) was used to compare the relative health of the bird species community across the major habitat types and over time. Simpson's Index is sensitive to the dominant (most abundant) species and insensitive to infrequent sightings. Because birds

are highly mobile and may potentially appear within any habitat at any time, this was chosen as an appropriate index.

Diversity was calculated separately for every season and major habitat type for each year from March 1994 through February 2001. The seasons were considered to be: winter = December through February, spring = March through May, summer = June, and autumn = September through November. July and August were not included, because of the different intensity of sampling between those months and June.

2.2.6 Preble's Meadow Jumping Mouse Data Analyses

Preble's mouse mark-recapture data were analyzed by Bruce Lubow of Colorado State University using Program MARK[®]. Capture probabilities and mouse densities were estimated with the immigration and emigration rates assumed to be zero (closed population estimate). Because none of the individual mice caught in the first session were recaptured during the second session, the residency/survival rate was also assumed to be zero. The estimated variances for these calculations are reported as standard error (se).

ArcView[®] 3.1 was used to process and analyze the telemetry data. The geometric center of a closed triangulation was used as the estimated location of the collared individual. The size of each triangulation polygon was used to derive the uncertainty of the estimations. Post-processing of the data was required to help account for signal bounce and interference. Extraneous bearings that increased the uncertainty of an estimation were discarded, as long as a minimum of three bearings remained in the set. Bearings that did not form closed triangulations were adjusted by up to 5°, if this allowed for closure. Bearing sets that still did not form a closed triangulation, or whose area was ≥ 0.5 ha, were discarded entirely. Distances were calculated from the resulting set of location points for each individual.

Descriptive summaries of the habitat characterization data were prepared and reported for both the entire drainage and by discrete distances from the stream, where appropriate.

3 Results and Discussion

The following sections present summaries of wildlife monitoring performed under the NRCPP during 2000. Comparisons with previous years are made in the discussions for each species group as appropriate. Many of the data are summarized by season. For the purpose of this document, seasons are defined as spring (March through May), summer (June through August), fall (September through November), and winter (December through February).

3.1 Significant Species

Significant species monitored during 2000 included big game mammals, large rodents and lagomorphs, carnivores, waterfowl, raptors, fish, herpetiles (reptiles and amphibians), and special-concern species. A list of the species included in these groups is provided in Appendix A. The data entry codes for significant species are also described in Appendix A. Discussions in the following sections concentrate on the various significant species groups.

It should be noted that two types of surveys (as discussed in Section 2) were used in collecting data on the significant wildlife groups discussed below. Sitewide significant species surveys recorded primarily area use, but they also recorded instantaneous habitat use for all significant species observed in a short time span over the entire Site. Multi-species census surveys provided data on habitat use per unit time of observation along permanently established walking transect lines. Results from both methods are discussed below.

A special effort was also made to monitor the Preble's meadow jumping mouse population in Woman Creek as part of the continuing study that has been conducted since Preble's mice were federally listed as a threatened species in May 1998. Radio telemetry was used to monitor Preble's mouse movement in that drainage, and the mark-recapture method was used to estimate population. The results of this sampling effort are summarized below in Section 3.1.8.5, and are presented in total in Appendix B.

3.1.1 Big Game Mammals

The most common big game species at the Site is the mule deer (*Odocoileus hemionus*). The current population at the Site is estimated at approximately 160 individuals. This estimate is based on a winter deer count, extrapolated to take into account the well-known fact that ungulate herds are routinely underestimated (Wallmo 1981). Site knowledge allows the ecologists to extrapolate observed numbers to a population estimate based on assumed underestimation from some areas of the Site. Habitat use varied through all available habitat onsite. Relative abundance of mule deer by habitat is discussed in Section 3.1.1.2.

White-tailed deer (*Odocoileus virginianus*) continue to populate the Site in small numbers. During the baseline characterization (DOE 1992), no white-tailed deer were recorded, but observations have increased in recent years, and now a small herd of white-tailed deer can often be observed in the lower Smart Ditch/Woman Creek confluence area. From one to several

individuals have also been observed commingling with mule deer more commonly than in the past, and white-tailed deer are now observed across the Site. With the increase in white-tailed deer numbers on the Site, the concern that they might hybridize, diluting the reproductive viability of the mule deer, is actually reduced. This is because each species has a sufficient number of individuals of its own species with which to breed.

Elk (*Cervus elephas*) were observed in Rock Creek periodically during the early summer, and one cow-calf pair was observed at a time that suggested the calf might have been born onsite. Elk continue to be in the vicinity during spring greenup, and during the spring of 2001, as this is written, a herd of approximately 80 to 100 elk has been observed regularly in grasslands immediately west of the Site.

3.1.1.1 Sitewide Significant Species Surveys—Big Game

Winter Deer Count Comparison—A sitewide survey was conducted on January 17, 2001 for the purpose of obtaining a year-end 2000 population census for big game. The year-end census is weather dependent, requiring snow-covered ground to provide the best visibility conditions for the most accurate count. This census is typically conducted during the last week of December of the survey year, or as soon as appropriate snow cover is available in January. A new snowfall on January 17, 2000 provided the required conditions for the year-end count; the census survey recorded 144 mule deer and 10 white-tailed deer. Because the success of winter surveys such as this are weather dependent, often not all deer present at the Site are visible to observers or identifiable by age and sex; therefore, not all deer are counted or divided into age/sex classes. The winter count has fluctuated since 1994, when the highest count of 164 deer was recorded. Figure 3-1 shows the winter mule deer population trend from 1994 to 2000.

The age class breakdown shows a continuing trend of fawn survival above one fawn for every two does (49f:70d). Although opinions vary among mule deer population authorities, a fall-season fawn-to-adult ratio of 30:70 is considered to be optimum for maintaining the herd (Fitzgerald et al. 1994). The number of fawns recorded in the year-end census (41) was considerably better than the mean winter fawn count (25.4) over the past seven years. It should be noted that censuses of mule deer normally yield low counts of fawns (Wallmo 1981). The year-end census showed 29% of the population as young-of-the-year, and some individuals likely went unrecorded. This number cannot be correlated directly to a fall count, because some winter kill occurs among deer herds during late fall and through the winter.

The number of bucks counted in the year-end census (40) was similar to that recorded in 1999 (42), and the ratio of does (59) to bucks remained similar (1.5:1), showing a good balance for a healthy herd. According to Wallmo (1981), a sex ratio of approximately two adult does per one adult buck indicates a very healthy mule deer population. The variations in mule deer numbers recorded at the Site probably represent normal population fluctuations, but other wildlife professionals, especially Site visitors from the Colorado Division of Wildlife, generally are encouraged and impressed with numbers at the Site. Figure 3-2 shows the age- and sex-class breakdown of the mule deer population from 1994 to 2000.

The number of deer observed during the year-end count (approximately 0.06 deer/ha, or 14 deer/mi²) has fluctuated since records have been kept. The relatively large mule deer

population at the Site is due to good range condition and the protection afforded them by the prohibition of hunting within Site boundaries. The lack of constant disturbance in the BZ also provides protection from stress, and normally promotes a good fawn survival rate.

Big Game Area Use Summary—In this section, monitoring data from 2000 sitewide significant species surveys are summarized by season (spring, summer, fall, and winter). These surveys were performed once each month from all passable roads in the Buffer Zone, thus providing 12 “snapshot” area use records for the year. Area use data are an important tool used by Site ecologists to help project planners time disruptive activities to avoid critical periods or essential habitat. Seasonal summaries of mule deer use at the Site reflect the species’ strong year-round preference for some locations and seasonal preferences for other locations. The mule deer and white-tailed deer area use data summaries, broken down by season, from the years 1997–2000, are provided in Tables 3-1 and 3-2, respectively.

The use patterns reflect two apparent area preference criteria. One preference is for specific seasonal habitat that meets certain survival requirements (e.g., protective cover for new fawns). A second important area preference is for secluded areas. Some areas preferred by the deer do not provide unique habitat but do offer isolation from disturbance. Figures 3-3 through 3-6 show area use for the four seasons for combined data from 1997 through 2000. Figure 3-7 shows the range of white-tailed deer observed during 2000.

3.1.1.2 Big Game Relative Abundance from Multi-Species Census Surveys

Mule Deer—Overall 2000 annual mule deer relative abundance was 0.149 observations per minute of survey (o/m). As illustrated by data summarized in Tables 3-3 through 3-6, mule deer habitat use and relative abundance have varied by season and by year over the entire monitoring interval (1995–2000). Mule deer generally exhibit the greatest observed relative abundance in winter and the lowest in summer, with spring and fall being similar. Relative abundance observed in the various habitats has been highly variable from year to year, but certain seasonal habitat affinities are evident. In spring, mule deer exhibit an affinity for woody habitat, and secondarily for grasslands. In summer, the affinity for woody habitat is still strong, but habitat use is otherwise generally more divided among all other habitats. In fall, woody habitats are again dominant, with grasslands also being important. In winter, mule deer are commonly observed in grasslands and tall upland shrubland. This winter use pattern most likely reflects an increased need for food during bad weather (i.e., greater time spent feeding), and the better shelter provided by Rock Creek shrublands. This habitat use pattern also corresponds with important use areas identified during the sitewide surveys.

White-Tailed Deer—Habitat use summaries based on multi-species census surveys (Tables 3-3 through 3-6) indicate that white-tailed deer use both shrublands and grasslands at the Site. White-tailed deer were in small groups of their own species, or in company with groups of mule deer. During 2000, small groups (2–6 individuals) of white-tailed deer continued to use the lower Smart Ditch/lower Woman Creek area. Single does were observed most often with mule deer groups in various parts of the Site. The present total population at the Site may be as many as 10 to 15 animals. The sitewide annual relative abundance of white-tailed deer in 2000 was 0.012 o/m, a considerable change from no observations in 1995.

3.1.2 Lagomorphs and Large Rodents (Sitewide and Multi-Species Surveys)

The most commonly observed lagomorph (rabbit or hare) at the Site during 2000 was the desert cottontail (*Sylvilagus audubonii*), with a mean sitewide annual relative abundance of 0.007 o/m. White-tailed jackrabbits (*Lepus townsendii*) and black-tailed jackrabbits (*Lepus californicus*) have been recorded, but individuals of both species are seldom observed. Desert cottontails, as in previous years, were most abundant in disturbed areas, scrap storage areas, trailer yards, storage areas, rip-rap areas, and other areas affording cover. Table 3-7 provides a summary of recorded seasonal habitat use and relative abundance by habitat for these species, based on multi-species census surveys. The 2000 area use data summary, based on sitewide surveys, is provided in Table 3-8.

Muskrats (*Ondatra zibethicus*) were recorded in impoundments (ponds), most often in association with cattails (*Typha* sp.), during 2000. Populations of this species are difficult to estimate without a heavy trapping regimen, but observations in 2000 confirmed the continued presence of the species in appropriate habitat. Table 3-8 summarizes recorded area use by this species.

Black-tailed prairie dog (*Cynomys ludovicianus*) populations in the vicinity continue to rebound from the regional die-off in 1994 that was caused by the plague epizootic. Prairie dogs were once established in several colonies at the Site, and have continued to repopulate some historical colony areas. By the end of 2000, prairie dogs were once more evident in three former colonies; however, some poisoning apparently took place in summer 2000 along the Site's south boundary. Until populations rebound to previous densities, specific prairie dog censuses are unnecessary.

Prairie dog populations at the Site are of interest, because the number of wintering raptors that can be supported by the Site is directly correlated to the prairie dog population. Prairie dogs are widely considered a "keystone" species in the prairie ecosystem, acting as a prey base for a number of mammalian and avian predators. When prairie dog numbers decline, these predatory species also suffer declines in population. Long-term nesting success of the Standley Lake bald eagle pair may ultimately depend on sufficient prairie dog populations in the vicinity, including any populations at the Site.

3.1.3 Carnivores (Sitewide and Multi-Species Surveys)

The most frequently observed carnivore species at the Site is the coyote (*Canis latrans*), and the next is the raccoon (*Procyon lotor*). Coyotes, which are active both diurnally and nocturnally, were found in all habitats, but were most visible in marshlands and grasslands as they hunted small mammals during the day. Mean annual sitewide relative abundance for coyotes was 0.009 o/m (the mean o/m has varied considerably for this species). Differences in observation rates may be influenced by vegetation density, which affects the species' visibility; time of day; proximity to dens or large carrion supplies; and other factors.

Three coyote dens and several juveniles were observed in 2000, confirming that the Site's coyotes successfully reproduced during the year. Typically, three to four coyote natal dens are

located each year at the Site. The estimated number of coyotes on the Site, based on results from sitewide surveys and Site knowledge, remains at approximately 14–16 individuals. Table 3-9 provides a seasonal habitat use summary for carnivores in 2000 based on multi-species census survey data. This summary presents primarily coyote relative abundance, because most other species are nocturnal and are seldom observed during daytime surveys. The 2000 area use data summary, based on sitewide significant species surveys, is provided in Table 3-10. Typically, coyotes are most visible where their prey species are abundant.

Raccoons are largely nocturnal, and are therefore most frequently documented from tracks, industrial area accidents, or through small-mammal trapping activities. (Site ecologists often intentionally live-trap raccoons to remove them from the vicinity of small-mammal traplines, because of the raccoons' penchant for robbing bait from the traps.) Raccoons or their sign were observed fortuitously in both the Industrial Area, where they frequented areas with food refuse, and the BZ near riparian channels and pond margins. The limited number of observations precludes making an accurate population estimate.

Mountain lion (*Felis concolor*) tracks were recorded again during winter surveys, showing a persistent, though casual use of the Site by this species.

The presence of several mammalian carnivore species, the top species in the food chain, is an indication of the good ecological condition of the Site. While this program does not attempt to track numbers of all carnivores at the Site, the estimate of steady coyote population over time is a good indication that prey species continue to be abundant. The top carnivores in an ecosystem must have a large, healthy population of prey species upon which to subsist. Reduced numbers of prey species are normally reflected in reduced abundance and species richness of carnivores.

3.1.4 Waterfowl—Ducks, Geese, and Shorebirds (Sitewide and Multi-Species Surveys)

As would be expected, the majority of the waterfowl species observed during 2000 sitewide significant species surveys and multi-species census surveys were concentrated around the impoundments (ponds). Habitat use reflected the strong preferences for open water, pond-margin mudflats, and associated wetlands (Tables 3-11 through 3-14). Area use varied somewhat between the fall/winter and spring/summer seasons (Table 3-15). Fall/winter area use was heavily concentrated on the major impoundments at the Site, while spring/summer use was more dispersed. Some observations during the breeding season occurred along creeks, in ditch and creek pools, and in greening-up grasslands.

Most waterfowl and shorebirds were observed on the large impoundments at the Site. Diving ducks, such as buffleheads (*Bucephala albeola*), common (*Mergus merganser*) and hooded merganser (*Lophodytes cucullatus*), ring-necked ducks (*Aythya collaris*), redheads (*Aythya americana*), and lesser scaup (*Aythya affinis*), were most commonly observed in the deeper ponds (A-3, A-4, B-5, C-2, and D-2). Species found more generally in shallow waters included blue-winged teal (*Anas discors*), green-winged teal (*Anas clypeata*), mallards (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), and gadwall (*Anas strepera*). Puddle-ducks, primarily mallards, were also observed in pools, at seeps, and along creeks. Great blue herons (*Ardea*

herodias) were observed on impoundment mudflats, and in ditches, short marshland, and wet meadows.

The most abundant year-round waterfowl at the Site during the 2000 multi-species census surveys were mallards (Tables 3-11 through 3-14). The mean annual sitewide relative abundance of mallards was 0.114 o/m. The relative abundance of most other waterfowl and shorebird species varied seasonally. Aside from the abundant mallards, gadwalls (0.041 o/m), ring-necked ducks (0.038 o/m), American coots (*Fulica americana*) (0.024 o/m), green-winged teal (0.022 o/m), and buffleheads (0.020 o/m) were the most common spring species. Not including mallards, the most common summer species were blue-winged teal (0.051 o/m), American coot (0.038 o/m), and pied-billed grebes (0.028 o/m). The other most common fall species included gadwall (0.016 o/m), blue-winged teal (0.012 o/m), green-winged teal (0.011 o/m), and pied-billed grebes (*Podilymbus podiceps*; 0.011 o/m). The most abundant species in winter was the ring-necked duck (0.035 o/m), followed by redhead (0.018 o/m) and common goldeneye (*Bucephala clangula*; 0.013 o/m).

The species richness of waterfowl indicates that waters at the Site are of sufficient quality to attract large numbers of waterfowl, including several species that nest at the Site yearly. Species richness ranged from a high of 23 species in spring to a low of 9 during winter. A number of the waterfowl species stop over during migration because of the diverse aquatic communities in the ponds and, to a lesser degree, the creeks on the Site. Figure 3-8 shows a comparison of species numbers observed since 1993. A significant decline in the species richness or numbers of waterfowl could be an early warning of declining water quality at the Site, therefore this is an important group to continue monitoring.

3.1.5 Raptors (Sitewide and Multi-Species Surveys)

Raptors observed at the Site include all those normally associated with the range and habitats of this area of Colorado (Andrews and Righter 1992). Raptor species using the Site varied between the spring/summer and fall/winter seasons, with great horned owls (*Bubo virginiana*), red-tailed hawks (*Buteo jamaicensis*), and American kestrels (*Falco sparverius*) remaining as year-round residents. Swainson's hawks (*Buteo swainsoni*) and turkey vultures (*Cathartes aura*) were observed on the Site only in spring/summer. Rough-legged hawks (*Buteo lagopus*), northern harriers, and golden eagles were observed mostly in fall/winter. A number of other less common species were recorded onsite in 2000. These included the merlin (*Falco columbarius*), long-eared owl (*Asio otus*), and Cooper's hawk (*Accipiter cooperii*). One new raptor species, the broad-winged hawk (*Buteo platypterus*), was observed in 2000.

Among most raptors, demonstrated habitat preferences are divided between woody habitats (roosting and nesting areas) and grasslands and wetlands (foraging habitats) (see Table 3-16). Falcon species were observed most frequently where their preferred prey (largely songbirds) was concentrated, commonly in riparian woodlands and shrublands. Being nocturnal, great horned and long-eared owls normally were recorded in roosting locations during daytime surveys (shrubland, woodland, and abandoned buildings). Buteos (the broad-winged hawks), including roughlegged, red-tailed, and Swainson's hawks, were most often observed either

roosting or nesting in riparian woodland, or soaring over marsh and grasslands where their prey is most abundant.

Red-tailed hawks, Swainson's hawks, great horned owls, and American kestrels nested at the Site in 2000. Recorded area use varied somewhat by season, but raptor observations were generally well dispersed across the Site during all seasons. Except within nesting territories, no particular concentration of activity was noted for any given species. Table 3-17 summarizes seasonal area use by raptors.

Relative abundance of raptors varied by season (Table 3-16), but the most abundant species year round was the great horned owl, with a mean annual relative abundance of 0.007 o/m. The American kestrel is also a year-round resident, with a 2000 mean relative abundance of 0.004 o/m. The red-tailed hawk's mean sitewide annual relative abundance was 0.003 o/m.

The continued presence of nesting raptors at the Site in 2000 indicates that habitat quality and protection from disturbances have contributed to making the Site a desirable location for raptors to reproduce. The normal seasonal species assemblages of raptors were observed at the Site, indicating that the habitat still provides the essential seasonal requirements for these species. Numbers and species richness remained similar to previous years, indicating that the Site probably supports the optimum population of these territorial species. Figure 3-10 shows a comparison of species numbers observed since 1993.

3.1.6 Fish Sampling

Fish were collected at nine locations in Rock Creek during July 2000. The purpose of this sampling effort was to better sample this stream, because 1998 sampling was conducted over a limited length of stream. Other streams were slated for sampling of riffle areas, but low precipitation and dry streambeds precluded sampling riffle areas. Sampling was timed to avoid spring floods to allow sampling more normal stream conditions.

The Site is dissected by four major stream drainages—Smart Ditch, Woman Creek, Walnut Creek, and Rock Creek—all flowing generally west to east across the property. These are headwaters streams that vary from ephemeral to intermittent, limiting the complexity of aquatic communities that have developed. Streams on the Site vary in width from a few inches (spring-fed flows) to five or six feet in downstream channels during spring runoff. These wide channels are often dry by summer. Upper headwaters, closer to the spring and seep discharge areas, may flow at a few gallons per minute all year, keeping small pools filled. Lower stream channels can be described as intermittent, with semi-permanent pools and channel subirrigation during the drier months. None of the streams on the Site maintain a permanent connection via constant flow of water to lower reaches in offsite areas.

Minnow traps were set out in areas where streamflow was sufficient to cover the traps, and trapping was done for two consecutive days at each sample point (see Figure 2-3). Limited numbers of fish were captured. Fathead minnows (*Pimephales promelas*) were captured in all locations sampled except Site 9. Tadpoles and leeches were present at some locations, and crawfish, garter snakes, and leopard frogs were also captured. Numbers at the different sample

sites varied widely, with greater numbers of fish trapped at the upstream locations that were closer to seep flows.

3.1.7 Herpetiles (Reptiles and Amphibians)

3.1.7.1 Amphibian Vocalization Monitoring

Boreal chorus frogs (*Pseudacris triseriatus maculata*) were recorded at 19 of the 20 sample locations (95%) surveyed in 2000. Twenty-five percent of the locations sampled had full choruses of frogs calling (vocalization index 3; Figure 3-10), and 40 percent had multiple individuals calling with overlaps between the calls (vocalization index 2; Table 3-18, Figure 3-10). The distribution of boreal chorus frogs heard during the surveys on Site in 2000 is shown in Figure 3-11.

The average water and air temperatures (°C) were 13.3° and 13.2°, respectively, on the evenings when sampling was conducted, and no precipitation occurred on either of the days. Cloud cover averaged about 11% on April 28 and 4% on May 1.

In 2000, boreal chorus frogs were found at more locations than in either 1998 or 1999. The number of locations where boreal chorus frogs were observed in the south Buffer Zone increased dramatically in 2000 compared to 1998 and 1999. In 1998, boreal chorus frogs were heard at 50% of the survey locations. In 1999, frogs were only heard at 44% of the survey locations. However, in 2000, they were heard at 89% of the survey locations. This is particularly interesting considering the Site received lower than normal precipitation last spring, resulting in fewer available breeding pools. Perhaps this forced individuals to congregate at a few locations, rather than being more spread out and less noticeable.

Comparison of 2000 vocalization index frequency data to 1998 and 1999 results, using only the locations that were sampled during all three years, revealed some changes also (Table 3-18, Figure 3-12). The abundance of boreal chorus frogs at many locations was somewhat less in 2000 compared to previous years (Figure 3-12). In 1998 and 1999, full choruses of frogs predominated at most locations (vocalization index 3). However, in 2000, full choruses were fewer, and most locations had multiple individuals calling, with overlaps among the calls (vocalization index 2). The lower abundance of boreal chorus frogs at most locations during 2000 may also have been a result of the lower than normal spring precipitation received at the Site in 2000. As a result, fewer breeding pools were available and so fewer numbers of breeding frogs were heard. However, when the vocalization indices for each year (at those locations in common across all years) were averaged, the 2000 mean vocalization index value of 2.06 fell between that observed in 1998 (1.94) and 1999 (2.19), suggesting that no substantial changes in the boreal chorus frog populations at the Site had occurred. Because amphibian species are semi-aquatic, they are often considered good indicators of aquatic community change (Blaustein 1995). The presence and general abundance of the boreal chorus frogs at the Site, even during dryer years, provides evidence of the high-quality wetland and aquatic environments that occur in the Buffer Zone at the Site.

3.1.7.2 General Herpetile Observations from Other Monitoring

Herpetile species observed during 2000 included the boreal chorus frog, northern leopard frog, bullfrog, western painted turtle (*Chrysemys picta*), and the prairie rattlesnake (*Crotalus viridis*). Other species were observed fortuitously, but not entered into survey databases.

Observations of these species are frequently sporadic and widely dispersed. Observations made during multi-species census surveys are summarized in Table 3-19, and observations from sitewide significant species surveys are summarized in Table 3-20. Habitat preference of herpetiles varied by species. Table 3-19 presents habitat use as recorded during multi-species census surveys.

The presence of several sensitive reptile and amphibian species is an indicator of ecosystem health within the various habitats at the Site. Aside from categorizing call-count vocalization intensity for stationary breeding frogs and toads, obtaining a census of herpetile species is difficult; therefore, estimates of populations cannot be made from the data presented here.

3.1.8 Special-Concern Species

Special-concern species are defined in Section 2.1.1.3. While the majority of the special-concern species that use or have potential to use the Site are animals, a few plant species also are included. It should be noted that these species are designated as special concern because of their rarity. Observations of rare species are inherently sporadic and infrequent; consequently, many of these species may not be observed at the Site every year. Lack of observations of special-concern species at the Site in any given year is not considered cause for alarm; however, no observations of a species for several years in a row would trigger a more intensive search, particularly if no regional decline in the species has been reported.

Aside from the Preble's meadow jumping mouse, which is resident at the Site, one other listed species is observed occasionally—the bald eagle (*Haliaeetus leucocephalus*). There are also several federal special-concern species and Colorado Species of Special Concern. Table 2-2 presents the Site's 2000 search list for special-concern species.

3.1.8.1 Threatened and Endangered Species

The only listed threatened or endangered species observed at the Site during 2000 was the Preble's meadow jumping mouse. Delisted species included the American peregrine falcon (*Falco peregrinus*). Peregrine falcons have nested in the Flatirons a few miles northwest of the Site for several years (EG&G 1995a). Observations of peregrine falcons included sightings from surveys and fortuitous observations. Preble's mouse monitoring is reported below in Section 3.1.8.5, and in detail in Appendix B.

These species are of concern at the Site because of their protected status under the ESA. Site activities must be planned such that no take (harassment or harm) of these species occurs during the time they are present within Site boundaries. DOE must enter into Section 7 consultation under the Endangered Species Act when Site actions may affect these species.

3.1.8.2 Federal Special-Concern Species

Federal special-concern species observed during 2000 included the eastern short horned lizard, the loggerhead shrike (*Lanius ludovicianus*), the northern goshawk (*Accipiter gentilis*), black-tailed prairie dog (*Cynomys ludocivianus*), and the western burrowing owl (*Athene cunicularia hypugea*).

3.1.8.3 Colorado Species of Special Concern

Colorado Species of Special Concern using the Site during 2000 included the northern leopard frog (*Rana pipiens*) and the American white pelican (*Pelecanus erythrorhynchos*).

3.1.8.4 Watch-Listed Species

Watch-listed species observed at the Site during 2000 included such raptors as the Swainson's hawk (*Buteo swainsoni*), the merlin (*Falco columbarius*), the Cooper's hawk (*Accipiter cooperii*), the sharp-shinned hawk (*Accipiter striatus*), the long-eared owl (*Asio otus*), the short-eared owl (*Asio flammeus*), the northern harrier (*Circus cyaneus*), the prairie falcon (*Falco mexicanus*), and the golden eagle (*Aquila chrysaetos*). Water birds included the bufflehead (*Bucephala albeola*), sora (*Porzana carolina*), and the black-crowned night heron (*Nycticorax nycticorax*). Songbirds on the watch-list included the grasshopper sparrow (*Ammodramus savannarum*). Herpetiles on the watch list included the red-sided garter (*Thamnophis sirtalis*).

3.1.8.5 Preble's Meadow Jumping Mouse Monitoring

The Preble's meadow jumping mouse (*Zapus hudsonius preblei*) was listed by the U.S. Fish and Wildlife Service as a threatened species in May 1998 (FR 1998). Because the conservation and protection of this species is an important issue at the Site, a special monitoring effort has been conducted for the past several years. Results from Preble's mouse monitoring help Site ecologists evaluate potential impacts from proposed remediation and Site closure projects, and allows the development of creative solutions to avoid unnecessary damage to Preble's mouse habitat during remediation.

3.1.8.5.1 Trapping Results

Trapping resulted in a total of 7,700 trap nights in 2000. During these trap nights, 2,337 small mammal captures were made, 36 of which were of Preble's mice.

Averaged over all transects and both sessions, trap availability for the capture of Preble's mice was 60%, which is equivalent to 4,620 available trap nights over the season. Traps considered unavailable to Preble's mice are those that captured other small mammal species, that were sprung but empty, disturbed and empty, or that were otherwise not functioning properly.

A total of 22 individual Preble's mice were captured over the season. (Of the 36 recorded captures, 16 were re-captures of the same individuals.) During the first session, 11 individuals were caught (15 captures)—eight adult males and three adult females. No Preble's mice were caught at the transects below Pond C-2 during the first session. Because these transects were

not a part of the mark-recapture effort, they were not run again during the second session. Over the second session, another 11 individuals were captured (21 captures)—five adult males, four adult females, and two juvenile males. None of the individuals caught in the first session were re-captured in the second session, and none of the individuals captured during 2000 were marked from previous years.

Preble's mice were captured at 9 of the 12 transects trapped (see Appendix B for details). Capture locations spanned the entire upper two-thirds of the creek. The maximum distance a Preble's mouse was captured away from the stream channel was approximately 15 m (49 ft). This is, of course, a product of where the traps were placed. Traps were generally located along either side of the stream channel, but if dense habitat diverged from the channel, the habitat was followed instead of the stream.

3.1.8.5.2 Population Estimation

Capture Probability—Models were estimated with capture probabilities that differed by sex, session, and stream section. Differences between capture and recapture probability were also examined. The best model (model weight $w_i = 83\%$) was the simplest, with a single capture/recapture probability of $23.2\% \pm 3.5\%$. The alternative models had some amount of support. In these, session 2 had higher trapping probabilities than session 1 ($27.3\% \pm 5.1\%$ vs. $18.9\% \pm 4.8\%$, $w_i = 6\%$); females were more easily trapped than males ($28.6\% \pm 6.5\%$ vs. $19.9\% \pm 4.5\%$, $w_i = 6\%$); and captures were more likely than recaptures ($26.5\% \pm 4.8\%$ vs. $19.7\% \pm 4.7\%$, $w_i = 5\%$).

The first two alternatives above are most likely due to bias generated from a single individual, mouse #153, a female caught during the second session who was captured a total of five times. Many Preble's mice caught on Site exhibit "trap-shyness," or learned avoidance of traps. Over the last three years of telemetry tracking at the Site, collared individuals have been documented as residing in or passing through areas containing baited traps, while rarely entering those traps (K-H 1999a, K-H 2000b). Mouse #153, however, displayed "trap-happy" behavior, or learned attraction to traps. This created an outlier in the data and introduced a bias to some of the stratified models that were explored.

Residency/Survival Rate—No individual was captured during both sessions, so the apparent residency/survival rate is zero. However, the sample size is too small to estimate residency/survival rates with any confidence—a low capture rate combined with a low density of mice results in a low probability of recapturing marked mice in the second session. Therefore, the residency/survival rate cannot be measured. It is also important to remember that only "apparent" residency and/or survival can be measured, and emigration is indistinguishable from mortality. Therefore, "residency/survival" represents the proportion of animals that survived, remained on the study site, and did not develop "trap-shyness."

Density and Population Estimations—The population was assumed to be closed for the duration of each trapping session (i.e., no permanent migration in or out of the study area). However, because baited traps draw mice from farther away than they may normally forage, an additional assumption was made regarding the actual area from which mice were drawn to the

study area. A standardized area expansion factor was developed by Bruce Lubow from telemetry data by White and Shenk (2000), who estimated the proportion of animals trapped in a trapping area that are actually residents of that area. From this was derived a transect extension that can be added to each end of the stream length along which transects are placed to account for animals drawn from adjacent areas. This estimated extension is $41.5 \text{ m} \pm 9.2 \text{ m}$ (se; $136.3 \text{ ft} \pm 30.1 \text{ ft}$). The adjusted length of stream trapped at each site was therefore the length of each transect plus the extension added to either side, but not double-counting areas where boundaries of adjacent transects overlapped.

The density estimate for Woman Creek in 2000 is 6.52 ± 1.04 Preble's mice per linear kilometer of stream. Assuming that Preble's mice do not occur downstream of Pond C-2, the section of Woman Creek inhabited by Preble's mice on Site is approximately 3.4 km (2 mi) long. This gives a population estimate of 22.2 ± 3.5 mice, which is almost exactly the number of individuals caught (22).

3.1.8.5.3 Telemetry Analysis

Fourteen of the twenty adult Preble's mice captured were fitted with radio transmitter collars. Fifteen collars were purchased at the beginning of the field season, although one was found to be nonfunctional by the time it was needed. Of the 14 collars used, four stayed on the mice until the batteries ran out, six fell off the mice prematurely, two were found on the bodies of individuals who died of unknown causes, one was eaten (with the mouse) by a rattlesnake, and one was removed by researchers because of concern for the well being of the individual. The high number of collars falling off prematurely was partly due to difficulty in crimping down the collar securely enough. Once a better crimper tool was employed, the percentage of collars that stayed on improved. Battery life ranged from 19 to 25 days. Mice were tracked with telemetry from 1 to 25 days, with the average being 14 days. Five individuals (3 males and 2 females) were tracked for at least 20 days. The telemetry data from these five individuals were used in movement analyses.

Six day-nests were found via telemetry tracking. All day-nests were above-ground mounds of grass approximately 15 cm (6 inches) in diameter, very similar to what has been found in past years and in other drainages. Both males and females used day-nests, and several individuals were tracked to more than one day-nest. No hibernacula or other underground burrows were found this year.

Movement Analysis—The greatest recorded distance away from the stream channel at which a collared Preble's mouse was tracked was $73 \text{ m} \pm 15 \text{ m}$ ($239 \text{ ft} \pm 49 \text{ ft}$), and about 9 m (30 ft) higher in elevation than the creek. This was mouse #158, an adult male, who spent about half his time in a bowl-shaped depression containing snowberry (*Symphoricarpos occidentalis*) and some coyote willow (*Salix exigua*) on a north-facing slope south of the creek. This distance is derived from telemetry, and so is subject to some uncertainty (see below for uncertainty analysis). The furthest from water that a mouse was physically seen was approximately 22 m (72 ft) from the stream. Two individuals were seen at this distance. Mouse #144 (adult female) was tracked to a grass day-nest on the edge of a chokecherry (*Prunus virginiana*) patch 3 m (10 ft) higher in elevation than the stream channel, and the body of mouse #145 (adult male) was

recovered from the top of a grassy, south-facing slope 1.5 m (5 ft) higher than the stream level. Both of these locations were recorded with a GPS unit with sub-meter accuracy.

Total distance ranged for each individual tracked was measured as the straight-line distance between the two farthest points taken for that mouse, regardless of topography, habitat, or relation to the stream channel. While this likely does not realistically reflect actual movements by individuals, any other measurement of movement is subjective and heavily biased by sample size. For the individuals tracked for 20 or more days, distances ranged varied from 238 m to $1,397 \text{ m} \pm 30 \text{ m}$ (781 ft to $4,583 \text{ ft} \pm 98 \text{ ft}$), with the average being 629 m (2,064 ft). The maximum distance ranged was by mouse #142, an adult male, and the first Preble's mouse caught in 2000.

The 24-hour distance was measured as a straight line between two points (telemetry, capture, or visual) with a time span of between 15 and 33 hours. The average 24-hour distance was 68 m (223 ft; standard deviation 75 m [246 ft], $n = 105$). The greatest distance ranged within a 24-hour period was $443 \text{ m} \pm 30 \text{ m}$ ($1,453 \text{ ft} \pm 98 \text{ ft}$), and was also by mouse #142. If this individual's movements followed the stream channel, as seems likely given the pattern of all points recorded for #142, the distance traveled would be closer to 476 m (1,562 ft).

Uncertainty Analysis—Telemetry triangulation is subject to measurement error. Signal interference and bounce are major contributors to uncertainty in telemetry tracking. As a way of measuring this uncertainty, an "error radius" was derived for each triangulation polygon created by a bearing set. Error radii ranged from 0.1 m to 38.5 m (0.3 ft to 126.3 ft; this maximum is artificial, because points with an error polygon $> 0.5 \text{ ha}$ [1.2 ac] were discarded). The mean is 11.8 m (38.7 ft), but because the distribution of error radii are highly left-skewed, the root mean square of the error radii (15 m [49 ft]) was used instead as a more realistic representation of the uncertainty of the telemetry points.

Comparisons with Previous Data—This is the third year in which Preble's mice have been tracked with telemetry at the Site. Work was conducted primarily in the Rock Creek drainage in 1998, Walnut Creek in 1999, and Woman Creek in 2000. Analyses were done that combined and compared the data from all three drainages.

Distance from water was measured to all telemetry and visual observation points from the three drainages ($n = 739$) using GIS. Distances were measured from either a stream channel or pond, whichever was closest. Ninety-three percent of all points were within 48 m (157 ft) of water, and 66% were within 16 m (52 ft). The maximum distance from water at which a collared individual was found in the Walnut Creek drainage was 58 m (190 ft), 73 m (239 ft) in Woman Creek, and 158 m (518 ft) in Rock Creek. While far away from a stream or pond, the individuals recorded at great distances were still found to be traveling within dense vegetation growing around hillside seeps (K-H 1999a). These seeps have discharge rills only 5–8 cm (2–3 in) wide that may still provide the mice with a source of free water. The majority of hillside seeps are found in the Rock Creek drainage. The distances at which collared individuals were found away from streams or ponds are significantly larger in Rock Creek than in either Walnut or Woman Creeks (Kruskal-Wallis ANOVA on Ranks, $P < 0.001$).

Another set of comparative analyses were done by looking at the distances ranged by those individual Preble's mice that were tracked for at least 20 days. This criterion limits the amount of bias due to sample size; however, it also severely limits the number of samples. In Rock Creek, there were only eight individuals tracked for at least 20 days, nine in Walnut Creek, and five in Woman Creek. Distance ranged was measured as the straight-line distance between the two most distant points taken for that mouse, regardless of topography, habitat, or relation to the stream channel. Individuals in Walnut Creek ranged significantly less than the mice in the other two drainages (one-way ANOVA, $P = 0.048$). When compared by sex instead of by drainage, females ($n = 9$) ranged over significantly shorter distances than males ($n = 13$; t-test, $P = 0.045$). The majority of females tracked for 20 or more days were from Walnut Creek (six, versus one from Rock Creek and two from Woman Creek), while Rock Creek had the majority of males (seven, versus three each from the other drainages). There was no significant difference in average distance ranged between individuals tracked during the early versus late sessions.

3.1.8.5.4 Habitat Characterization

A total of 102 plant species were recorded during habitat characterization of Woman Creek in 2000. Of these, 69% were native species. Analyzed by distance to stream, the greatest mean number of species per quadrat was 10.2, from the 15-m (49-ft) distance category. As expected, the dominant species associations near the stream were riparian woodland and shrubland types, which changed to mesic grassland farther upgradient.

Tree canopy was present only within 5 m (16 ft) of the stream, and plains cottonwood (*Populus deltoides*) and Siberian elm (*Ulmus pumila*) were the only tree species recorded. Shrubs were also primarily within 5 m of the stream. Species included coyote willow, leadplant (*Amorpha fruticosa*), and chokecherry. A small amount of shrub canopy (6%) was also found at the 50-m (164-ft) distance, coinciding with an old irrigation ditch that paralleled the stream. Short shrub cover ranged between approximately 2 and 7% up to the 25-m (82-ft) distance category. Forb cover was highest at the 5-m distance (35%) but was present throughout. Graminoid cover increased with increasing distance from the stream, from 20% at 0 m to 70% at 50 m. Herbaceous density (a measure of horizontal vegetation density) was highest at 0 m (94%) and then leveled out around 28–35% from the 15-m category through the 50-m category.

The average width of the stream was 1.8 m (6 ft), and the average width of the riparian vegetation was 16.2 m (53 ft). Soil textures were primarily clayey close to the stream, changing to primarily loamy with increasing distance.

3.2 Migratory Birds

Migratory birds are monitored using two methods: migratory bird transect surveys, and multi-species census surveys. Each method collects different combinations of data, and each provides specific types of information on species population trends and habitat use.

As of 2000, 189 species of birds have been recorded at the Site. At present, 74 species of birds have been confirmed to be or are suspected of breeding at the Site. Confirmed breeding species

are those species that have been observed building nests or tending eggs or young, or for which young, flightless nestlings have been observed. Suspected breeding species are those that have been observed carrying nesting material, food, or other such indicators of breeding activity without actual visual confirmation of the presence of a nest or young. Among the 103 species of neo-tropical migrants known to use the Site, 45 are confirmed or suspected breeders at the Site.

Relative abundance categories of all bird species using the Site since 1991 are shown in Table 3-21. This table is based on observed bird distribution by habitat during migratory bird surveys, multi-species census surveys, sitewide surveys, project-specific surveys, and fortuitous observations. This summary table shows a running tally of species recorded at the Site since 1991, and presents relative abundance categories (e.g., abundant, common, rare, etc.) in appropriate habitats for each species. The table does not estimate total population numbers of each species inhabiting the Site, but is intended as a cumulative summary of birds observed by all methods at the Site. Note that some species are very habitat specific, while others are ubiquitous.

Evaluation of habitat use by birds, as indicated by data from cumulative combined records for all observation methods since 1991, yields different total species numbers for the different habitats than do the species richness data from bird surveys alone (discussed below in Section 3.2.2). Based on all combined data, there are 189 bird species that use the Site at some time during the year. Bird species richness in the major habitats at the Site is 96 species in grasslands, 91 species in tall upland shrubland, 82 species in riparian shrubland, 114 species in riparian woodland complex, 118 species in wetlands (including water), and 54 species in disturbed habitats (Table 3-21). Seasonal use also varies, with the greatest species richness observed during spring and fall (146 and 120, respectively), and lowest richness in winter (57).

3.2.1 Bird Relative Abundance from Multi-Species Census Surveys

Assessment of relative abundance is a means of determining relative numbers of species within various habitats and sitewide. The 2000 multi-species survey results for migratory birds (exclusive of waterfowl and raptors, which were discussed in previous sections) were analyzed for relative abundance of species within specified habitats by season, sitewide by season, and sitewide for the year. Comparisons made in the following sections are based on relative abundance of species within habitats and sitewide. Tables 3-22 through 3-25 show seasonal and annual summaries of bird relative abundance sitewide.

3.2.1.1 Sitewide Relative Abundance

As shown in Tables 3-22 through 3-25, redwinged blackbirds (0.214 o/m) were the most common songbirds in 2000, compared to 0.172 o/m in 1999. Several other species are also quite abundant at the Site, largely on a seasonal basis. In spring, these species include the vesper sparrow (*Pooecetes gramineus*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), barn swallow (*Hirundo rustica*), and cliff swallow (*Hirundo pyrrhonata*). As summer progresses, mourning doves (*Zenaida macroura*), American goldfinches (*Carduelis tristis*), and song sparrows (*Melospiza melodia*) also become more

abundant. As fall progresses, vesper sparrows, house finches, western meadowlarks, red-winged blackbirds, and black-billed magpies (*Pica pica*) are abundant. The assemblage changes in winter, with American tree sparrows (*Spizella arborea*), black-billed magpies, European starlings, and northern flickers (*Colaptes auratus*) most abundant. In general, the most common species remain the same from year to year, but relative abundance for each species varies.

3.2.2 Migratory Bird Survey Summaries

3.2.2.1 Species Richness & Composition

There have been 153 species of birds recorded along bird survey transects at the Site since bird surveys were initiated in 1991. Additional species have been recorded in the course of other surveys. Broken down by general habitat type, species recorded using this method have included 90 species within grasslands, 92 in wetlands, and 130 within woody habitats. Woody habitats include riparian shrubland and riparian woodland, as well as tall upland shrublands fed by hillside seeps.

During 2000, 80 species of birds were recorded along migratory bird transect routes on Site. This is the lowest number of species recorded in a calendar year since year-round surveys began in 1994. The average number of species recorded per year from 1994 through 1999 was 88, with a high of 98 species in 1996. Several species that, while never common, were seen regularly before but not during 2000 include the common grackle (*Quiscalus quiscula*), the dark-eyed junco (*Junco hyemalis*), and the rough-legged hawk. Of these species, the rough-legged hawk and the dark-eyed junco were observed during other surveys, along with other less common bird species that were not recorded on bird survey transects. There was one new species recorded at the Site in 2000—the broad-winged hawk.

Avian species composition between the major habitat types and over the years were compared using the Jaccard Similarity Index (Digby and Kempton 1987; Table 3-26). Only surveys taken during June were used, and only from the years 1994–2000, to maximize comparability. June surveys prior to 1994 were done by various individuals with different levels of training and identification skills.

Overall, the species composition within grasslands and wetlands are more similar to each other than either is to the species composition in woody habitats, which is to be expected given the different structural components of woody habitats. Wetland habitats had the greatest year to year variation in June bird species composition, with the species composition of the grasslands and woody habitats being relatively stable from one year to the next (Figure 3-13). There appears to be a progressive shift in woody habitat species composition, such that the species composition in 2000 was more similar to the composition in recent years than to earlier years (Figure 3-14), but closer review shows this to be largely the result of uncommon, incidental species that have a high chance of not being seen in woody habitats from one year to the next.

The one real trend of concern is the increasing rarity of bald eagle sightings at the Site. From a high of 10 sightings in 1995, bald eagles have not been recorded during bird surveys since 1997. Fortuitous observations (i.e., not during actual surveys) are still made occasionally. This trend

is not unexpected, because the extent and densities of prairie dog populations in the general vicinity have decreased significantly. The loss of prey, and the replacement of grassland foraging habitat with subdivision development on adjacent lands, has displaced a number of raptors, particularly the wintering populations. Rather than this decline being a result of Site activities, the reason is apparently habitat loss—and thereby prey species loss—due to urban sprawl.

3.2.2.2 Species Diversity

Simpson's Index of Diversity (TWS 1980) was used to compare the relative health of the bird species community across the major habitat types and over time. Simpson's Index is sensitive to the dominant (most abundant) species and insensitive to infrequent sightings. Because birds are highly mobile and may potentially appear within any habitat at any time, this was chosen as an appropriate index.

Diversity was calculated separately for every season and major habitat type for each year from March 1994 through February 2001 (Figure 3-15; Table 3-27). The seasons were considered to be: winter = December through February, spring = March through May, summer = June, and autumn = September through November. July and August were not included, because of the different intensity of sampling between those months and June.

Throughout all seasons, diversity is almost always highest within the woody habitats. During June, diversity within the grasslands is consistently higher than in the wetlands; this is not the case the remainder of the year. Within habitats over time, woody habitats also have the most stable level of diversity for every season. Diversity in all habitats is least stable in the winter. For grassland and woody habitats, diversity is the most stable in June. Diversity in wetlands is most stable in the spring, although this is entirely due to the large drop in June diversity in wetlands in 2000. This drop in diversity was the result of both the smallest number of species (20) and the largest number of red-winged blackbirds (374 individuals) ever observed in that habitat during June.

Looking over trends for the last seven years, bird diversity in wetlands appears to be gradually increasing in winter (0.61 in 1994 to 0.87 in 2000), while diversity seems to be steadily decreasing in grasslands in spring (0.83 in 1994 to 0.71 in 2000). No other trends are discernible. Ironically, the increase in diversity in wetlands during winter is due to fewer individual birds being seen overall. Flocks of one species combined with infrequent sightings of others results in a low diversity value. So, while the number of species recorded in winter 1994 was the same as that in 2000 (7), the number of individuals of each species seen was more evenly distributed in 2000. The decline in bird diversity in grasslands is primarily due to fewer numbers of species (34 in 1994 versus 24 in 2000), greater numbers of western meadowlarks (155 in 1994 versus 197 in 2000, with a high of 201 seen in 1998), and fewer vesper sparrows (118 in 1994 versus 67 in 2000).

3.2.2.3 Population Density

The purpose of the distance transect method that has been used for bird surveys on Site since 1991 was to allow the estimation of population densities through a well-established standard

methodology. Distance sampling theory allows an estimate of density to be made on an incomplete count; i.e., knowing that some birds will go uncounted, and that the ability of an observer to detect birds decreases as distance from them increases (Buckland et al. 1993). This sampling theory has been shown to be a robust and accurate means of estimating population densities when a complete census of an area is impractical, but *only* if certain important assumptions in both sampling methodology and analysis are met (Buckland et al. 1993; Thomas et al. 1998; TWS 1980). When these assumptions are not met, density estimates can become grossly inaccurate and imprecise. With re-examination of the Site methodology, established through consensus of an interdisciplinary committee during development of standard methodology to be applied to Ecological Evaluation work here in the early 1990s, it has become apparent that neither the sampling methodology nor the analytical technique previously used for bird surveys on Site support these strict assumptions.

For past analyses, survey transects were treated as variable-width census transects, and bird density was calculated using the Leopold method (Emlen 1971, 1977). This is a widely used method, although it is known that the Leopold method, in use since the 1930s, overestimates density by about 150%, and that obtaining accurate density estimates from variable-width census transects using any analysis method is difficult (TWS 1980; Buckland et al. 1993). In past years, this presumed overestimation of density has had little effect in final data interpretation, because only trends have been used in final impact determinations. New analytical methods were examined for this annual report, both to evaluate the survey methodology, and to re-examine the ability of the monitoring technique to answer data needs.

Allowing the transect to have an effectively infinite width, and using more recently developed rigorous statistical models, provides much more accurate and precise density estimates (Buckland et al. 1993; Thomas et al. 1998). However, these newer methods require strict adherence to certain aspects of the field methods so that model assumptions are met. The freeware software DISTANCE (Thomas et al. 1998) uses state-of-the-art distance sampling theory models to estimate population densities. Site bird survey data from 1994 through February 2001 were analyzed with DISTANCE. During this analysis, it became evident that several critical model assumptions had not been met by the existing survey methods. The method employed at the Site (apparently established to contribute species observations for an overall species list) recorded birds in flight, and these were placed arbitrarily within distance categories when entered into the database, based on habitat type. Under the strict method required to conform to the newer data analysis method, birds in flight should not have been included in the analysis—only perched birds and their respective distances from the transect centerline should be used in the analysis. As a result, the detection histograms used in the analysis models were skewed (Figure 3-16), and neither accurate nor precise density estimates could be made.

As a result of the reexamination of the efficacy of the existing methodology to provide requisite data for application of the newer analytical method, and the changing data needs as the Site proceeds with closure, the Ecology Group has determined that a different methodology should be used. The 2001 field sampling plan for bird surveys details these changes.

4 Conclusions

The Site continues to provide a unique refuge along the central Front Range for a large number of bird and mammal species. The presence of this refuge results in the majority of the Site having been protected for more than two decades from grazing, development, and other disturbances. The area enclosed by the 1950s BZ has experienced this singular habitat protection for 50 years. The exclusion of grazing and development has allowed the native prairie/montane ecotonal area in the BZ to rebound from its previously overgrazed state. The Site does, however, suffer from the influences of nearby development, adjacent industrial activities, historical fire suppression, and regional weed infestations. While wildlife movement corridors continue to remain open, providing more mobile species with the opportunity to enter and leave the Site at will, the Site has become more isolated from adjacent ecological communities each year. There is now, however, a public groundswell of interest in preserving the remaining greenbelt in the area surrounding the Site. Recent acquisitions of adjacent lands by public open-space entities have preserved portions of the essential corridors that connect the Site to surrounding open lands. This has set the stage for cooperative management of the natural resources on the Site and the adjacent lands. This cooperative management will aid in preventing outside influences from degrading the current high quality of the Site's natural resources.

Large-scale real estate development, mining, and water diversions on other large tracts of land along the Front Range have already destroyed or degraded much of the native habitat that was once available. It is due to the protection and isolation of the BZ that rare or imperiled species, and the present species diversity, are found at the Site. A number of the species at the Site are sensitive species or indicator organisms that, by their presence—or more significantly, by their absence—will indicate the ecological health of an area. Their continued presence attests to the good habitat values at the Site.

At the end of the 2000 field season, 253 terrestrial vertebrate species had been verified as using the Site's ecosystems. This is an impressive diversity when compared to the 322 terrestrial vertebrate species found at Rocky Mountain National Park, an area 98% larger than the Site. The Site's diversity includes 189 species of birds (20 are raptors), 3 big game species, 12 species of carnivores, 3 lagomorphs, 5 large rodents, 19 small mammal species, 6 bats, 11 reptiles, and 7 amphibians recorded since 1991. No definitive inventory of arthropods and other invertebrates has been made, but baseline sampling produced a large array of arthropod taxa. This high species diversity and continued use of the Site by numerous special-concern species verifies that habitat quality for these species has remained viable and that ecosystem functions are being maintained.

One of the goals of the *Integrated Monitoring Plan – Ecology* (K-H 1999) is to make annual assessments of endpoints for wildlife populations at the Site. Monitoring performed under the NRCPP tracks the populations of wildlife species and indicates the ecological health of the Site, as well as effects from nearby activities.

A healthy natural environment provides a wide variety of ecological niches. This ecological health is reflected in species richness and population dynamics. All wildlife species in an ecosystem require healthy, well-balanced habitats in which to live and reproduce. Degraded habitat is reflected by lower numbers and reduced diversity of wildlife. The data collected during the 2000 field effort indicate that wildlife populations are stable and species richness remains high. Therefore, current Site activities are not having an adverse effect on BZ ecosystems.

The mule deer population has fluctuated, and is currently estimated at about 160 animals. Male-to-female and young-to-adult ratios are well within the constraints of what wildlife experts consider a healthy deer herd. The appearance of elk cows and a calf during the calving season is an interesting development, and may be a result of the generally expanding regional elk herd. There is evidence (skeletal remains) that elk used the area in the past, and if the movement corridor remains open, they will apparently continue to use the Site seasonally. It is equally interesting that mountain lions continue to visit the Site sporadically. This normally shy, secretive species is unusual in predominantly prairie habitat, but the mountain lion may range onto the Site because of the large mule deer herd. Its appearance also illustrates the connectivity of the Site to the montane habitats to the west.

Songbird density and diversity numbers indicate little change in songbird use of all habitats at the Site over the past decade. Completing an accurate census of migratory waterfowl, carnivores, and herpetiles is more difficult, but these species continue to be observed in numbers similar to past years. The coyote population maintained several packs across the Site, and several natal dens were discovered. The four raptor species that most commonly nest at the Site successfully reared young in 2000. The normal migratory assemblage of waterfowl visited the Site in the spring and fall of 2000, and the species that commonly breed at the Site were observed with broods of young.

Preble's mouse monitoring provided additional information on habitat use, and helped to better describe the population and its habitat in Woman Creek. This information has continued to add to the Site's ability to predict the presence of the Preble's mouse, and has given new hints to its behavior.

The long-term, year-round ecological monitoring program conducted under the NRCPP continues to be an essential tool for identifying, describing, and quantifying fluctuations in wildlife populations, wildlife habitat use, and changes in the species that use the Site as year-round or seasonal habitat. Wildlife population densities vary constantly with natural pressures, and only well-integrated, long-term monitoring such as this can identify consequences of natural influences versus consequences of human activities. The data produced are an invaluable tool in predicting and avoiding ecological impacts resulting from projected human activities. If sensitive species dwindle in numbers or disappear, a serious environmental health problem is indicated. Monitoring and surveys such as those carried out by the NRCPP detect trends of this sort, and act as an "early warning system" for impending ecological problems. This function will become increasingly important as remediation activities at the Site increase, and will play an essential role in assessing natural resource damages.

5 References

- Andrews, R., and R. Righter . 1992. Colorado birds: A reference to their distribution and habitat. Denver Museum of Natural History. Denver, CO.
- Blaustein, A.R., and D.B. Wake. 1995. The puzzle of declining amphibian populations. *Scientific American* 272(4):52-57.
- Buckland, S.T., Anderson, D.R., Burnham, K.P. and Laake, J.L. 1993. Distance sampling: Estimating abundance of biological populations. Chapman and Hall, London, reprinted 1999 by RUWPA, University of St. Andrews, Scotland. 446 pp.
- CFR. 1979. 10 CFR Part 1022, Compliance with floodplain/wetlands environmental review requirements (March 7).
- CFR. 1980. 40 CFR Part 230 § 404(b)(1) Guidelines for specification of disposal sites for dredged or fill material (December 24).
- CO. 1984. Colorado Weed Management Act, CRS 1984 as amended, Article 5.5, Undesirable Plant Management
- CO. 1991. Colorado nongame, threatened, and endangered species conservation act, CRS 33-1-115, 33-2-101 to 33-2-107. State of Colorado (October).
- Digby, P.N., and R.A. Kempton. 1987. Multivariate analysis of ecological communities. Chapman and Hall, London, UK. 206 pp.
- DOE. 1988. Order 5400.1: General environmental protection program. U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (November 9).
- DOE. 1989a. Order 4300.1B: Real property management. U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (February 7).
- DOE. 1989b. Order 6430.1A: General requirements, construction facilities and temporary controls. U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (April 6).
- DOE. 1992. Baseline biological characterization of the terrestrial and aquatic habitats at Rocky Flats Plant. U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (September).
- DOE. 1994a. EMD operating procedures, Volume V: Ecology. U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (December).
- DOE. 1994b. Identification and protection of threatened, endangered, and special-concern species (1-D06-EPR-END.03). U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (April).

- DOE. 1994c. Migratory bird evaluation and protection (1-G98-EPR-END.04). U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO.
- DOE. 1995. Ecological monitoring program, 1995 annual report. U.S. Department of Energy, Rocky Flats Environmental Technology Site, Jefferson County, CO.
- DOE. 1997. Wetland identification and protection (1-S73-ECOL-001). U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (January 3).
- DOE. 1998. Natural resource management policy. U.S. Department of Energy. Rocky Flats Environmental Technology Site, Golden, CO (September 30).
- EG&G. 1993. Report of findings: 2nd year survey for the Preble's meadow jumping mouse. Prepared by R. Stoecker Environmental Consultants, for ESCO Associates, Inc., Rocky Flats Environmental Technology Site, Jefferson County, CO.
- EG&G. 1994. FY93 Resource Protection Program annual wildlife survey report. EG&G Rocky Flats. Rocky Flats Environmental Technology Site, Golden, CO (April 29).
- EG&G. 1995a. 1994 Annual threatened and endangered species status report for Rocky Flats Environmental Technology Site. EG&G Rocky Flats, Rocky Flats Environmental Technology Site, Golden, CO (June 7).
- EG&G. 1995b. 1994 Annual wildlife survey report, Natural Resources Protection and Compliance Program. Rocky Flats Environmental Technology Site. EG&G Rocky Flats, Rocky Flats Environmental Technology Site, Golden, CO (April 24).
- Emlen, J.T. 1971. Population densities of birds derived from transect counts. *Auk* 88:323-342.
- Emlen, J.T. 1977. Estimating breeding season bird densities from transect counts. *Auk* 94:455-468.
- EO. 1977a. Executive Order 11990. Protection of Wetlands. May 24, 1977.
- EO. 1977b. Executive Order 11988. Floodplain Management. May 24, 1977.
- Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. Mammals of Colorado. Denver Museum of Natural History and University Press of Colorado, Denver.
- FR. 1998. Endangered and threatened wildlife and plants; Final rule to list the Preble's meadow jumping mouse as a threatened species. Volume 63, Number 92, pp. 26517-26530. U.S. Fish and Wildlife Service. May 13.
- JeffCo, 1991. Jefferson County undesirable plant management plan. Jefferson County Board of Commissioners, December.
- Jennrich, R.I., and F.B. Turner. 1969. Measurement of non-circular home range. *J. Theor. Bio.* 22:227-237.

- K-H. 1997a. Ecological resource management plan for Rocky Flats Environmental Technology Site. Kaiser Hill Company, Rocky Flats Environmental Technology Site, Golden, CO (February).
- K-H. 1997b. Quality assurance instructions for Ecology data entry. Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, CO (May).
- K-H. 1997c. 1996 Annual wildlife survey report, Natural Resource Compliance and Protection Program. Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, CO (March).
- K-H. 1998a. 1998 frog and toad vocalization survey field sampling plan for Rocky Flats Environmental Technology Site. Kaiser-Hill Company, LLC, Rocky Flats Environmental Technology Site, Golden, CO.
- K-H. 1998b. 1997 Annual wildlife survey report, Natural Resource Compliance and Protection Program. Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, CO (May).
- K-H. 1999. Rocky Flats Environmental Technology Site integrated monitoring plan—FY99. Prepared by Kaiser Hill Company, with City of Broomfield, City of Arvada, City of Westminster, City of Northglenn, City of Thornton, Colorado Department of Public Health and the Environment, and U.S. Environmental Protection Agency. Golden, CO (September).
- K-H. 2000a. 2000 ecology field sampling plans for Rocky Flats Environmental Technology Site. Prepared by Exponent for Kaiser-Hill Company, LLC. Rocky Flats Environmental Technology Site, Golden, CO.
- K-H. 2000b. 1999 annual wildlife report for Rocky Flats Environmental Technology Site. Prepared by Exponent for Kaiser-Hill Company, LLC. Rocky Flats Environmental Technology Site, Golden, CO.
- Mossman, M.J., and R. Hine. 1984. The Wisconsin frog and toad survey: Establishing a long-term monitoring program. Wisconsin Endangered Resources Report 9. Bureau of Endangered Resources, Wisconsin Department of Natural Resources, Madison, WI.
- Mossman, M.J., and R. Hine. 1985. Wisconsin's frog and toad survey, 1984. Wisconsin Endangered Resources Report 16. Bureau of Endangered Resources, Wisconsin Department of Natural Resources, Madison, WI.
- Mossman, M.J. 1998. Personal communication (conversation on October 27 with J.K. Nelson, Exponent, Boulder, CO). Wisconsin Department of Natural Resources, Madison, WI.
- NBS. 1997. Calling amphibian surveys. Online protocols for amphibian monitoring. Internet address <http://www.im.nbs.gov/amphib/naampcall.html>. National Biological Survey.

RMRS. 1996. 1995 Annual wildlife survey report, Natural Resources Protection and Compliance Program. Rocky Mountain Remediation Services. Rocky Flats Environmental Technology Site, Golden, CO (April 25).

Thomas, L., J.L. Laake, J.F. Derry, et al. 1998. Distance 3.5. Research Unit for Wildlife Population Assessment, University of St. Andrews, UK.

TWS. 1980. Wildlife management techniques manual; fourth edition. S.D. Schemnitz (Ed.) The Wildlife Society, Washington, DC, 686 pp.

USC. 1958. Fish and Wildlife Coordination Act of 1958, 16 U.S.C. 661 et. seq. as amended. U.S. Congress.

USC. 1970. National Environmental Policy Act of 1969 as amended. Title 42 Chapter 55, Sec. 4321 et. seq.. U.S. Congress.

USC. 1973b. Endangered Species Act of 1973, 16 U.S.C. 1531 et. seq. as amended. U.S. Congress.

USC. 1973a. Migratory Bird Treaty Act, 16 U.S.C. 703 et. seq. as amended. U.S. Congress.

USC. 1975. Federal Noxious Weed Act, as amended. Title 7, Chapter 61, Sec. 2801 et. seq. U.S. Congress.

USC. 1977. Clean Water Act, Federal Water Pollution Control Act as Amended. 33 U.S.C. 1251 et. seq.

USC. 1978. Bald and Golden Eagle Protection Act, 16 U.S.C. 668 et. seq. as amended. U.S. Congress.

USC. 1980. Comprehensive Environmental Response, Compensation, and Liability Act of 1980. 42 U.S.C. §§ 9601 to 9675.

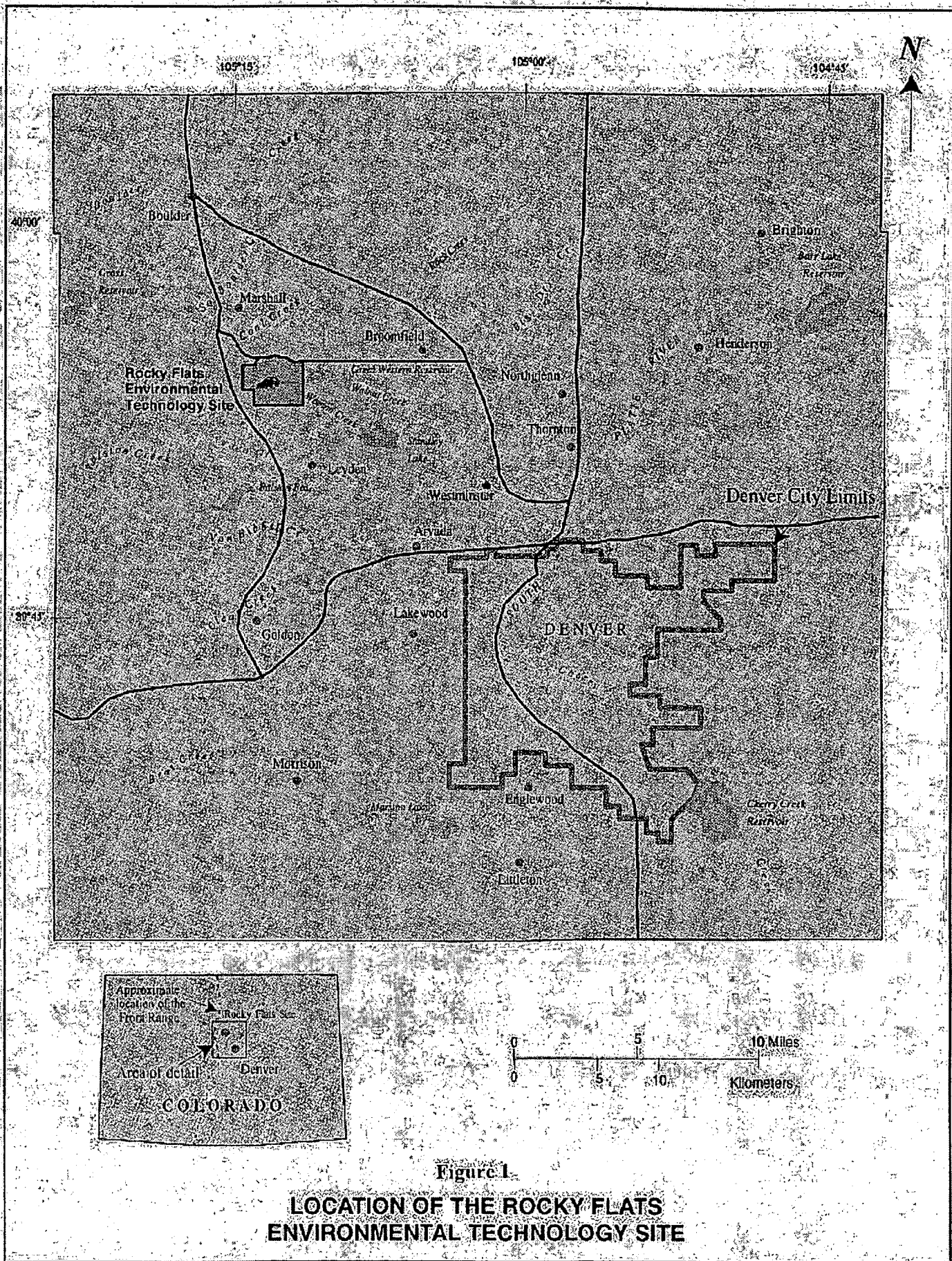
USFWS. 1999. Interim survey guidelines for Preble's meadow jumping mouse. U.S. Fish and Wildlife Service, Denver Field Office, Lakewood, CO (May).

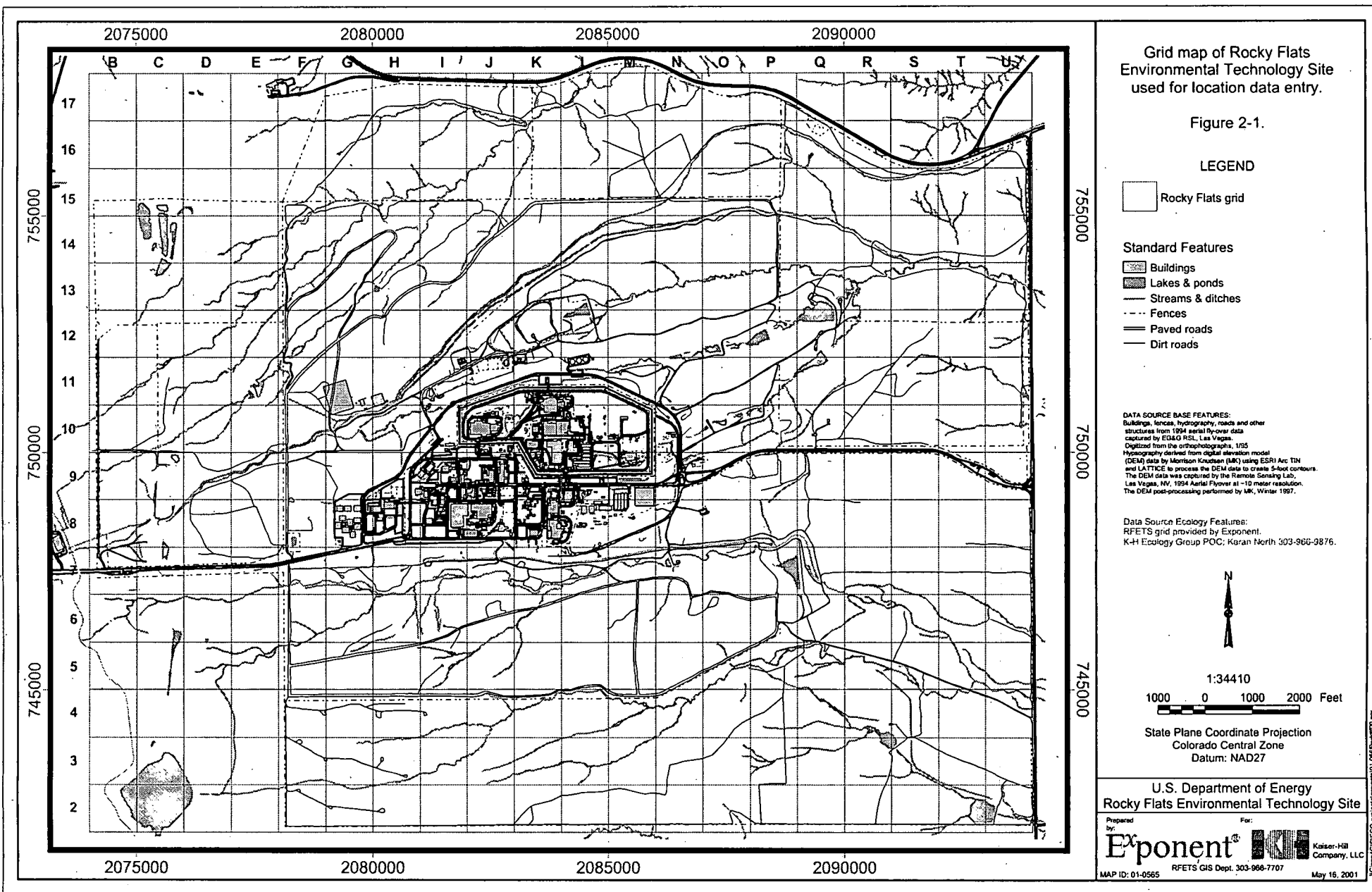
Wallmo, O.C. 1981. Mule and black-tailed deer of North America. University of Nebraska Press, Lincoln.

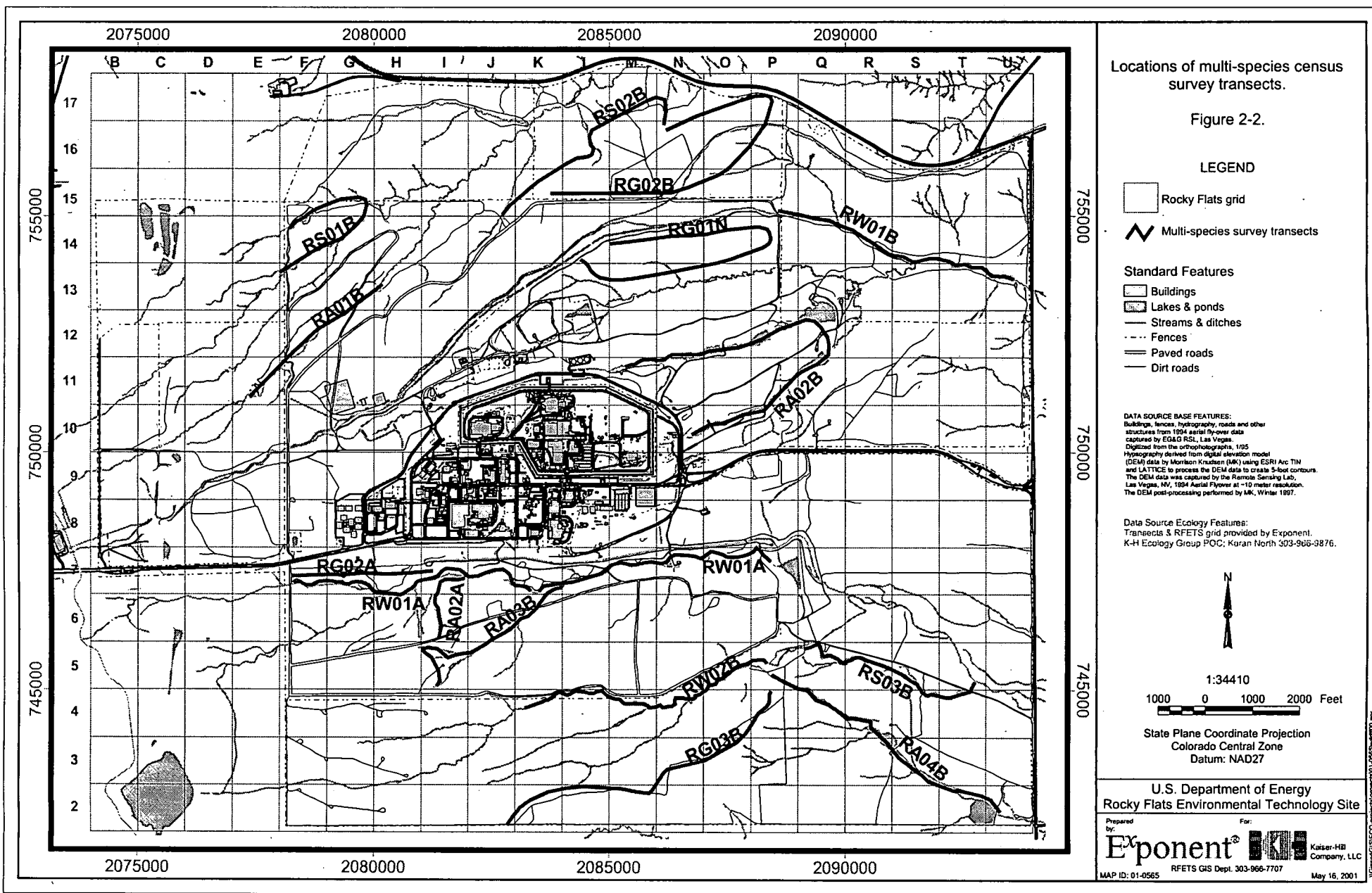
WGFD. 1985. The mule deer of Wyoming. Wyoming Game and Fish Department, Cheyenne.

White and Shenk. 2000. Personal communication (conversation on January 18 with M.M. Fink, Exponent, Boulder, CO). Colorado Division of Wildlife, Fort Collins, CO.

Figures







2075000

2080000

2085000

755000

755000

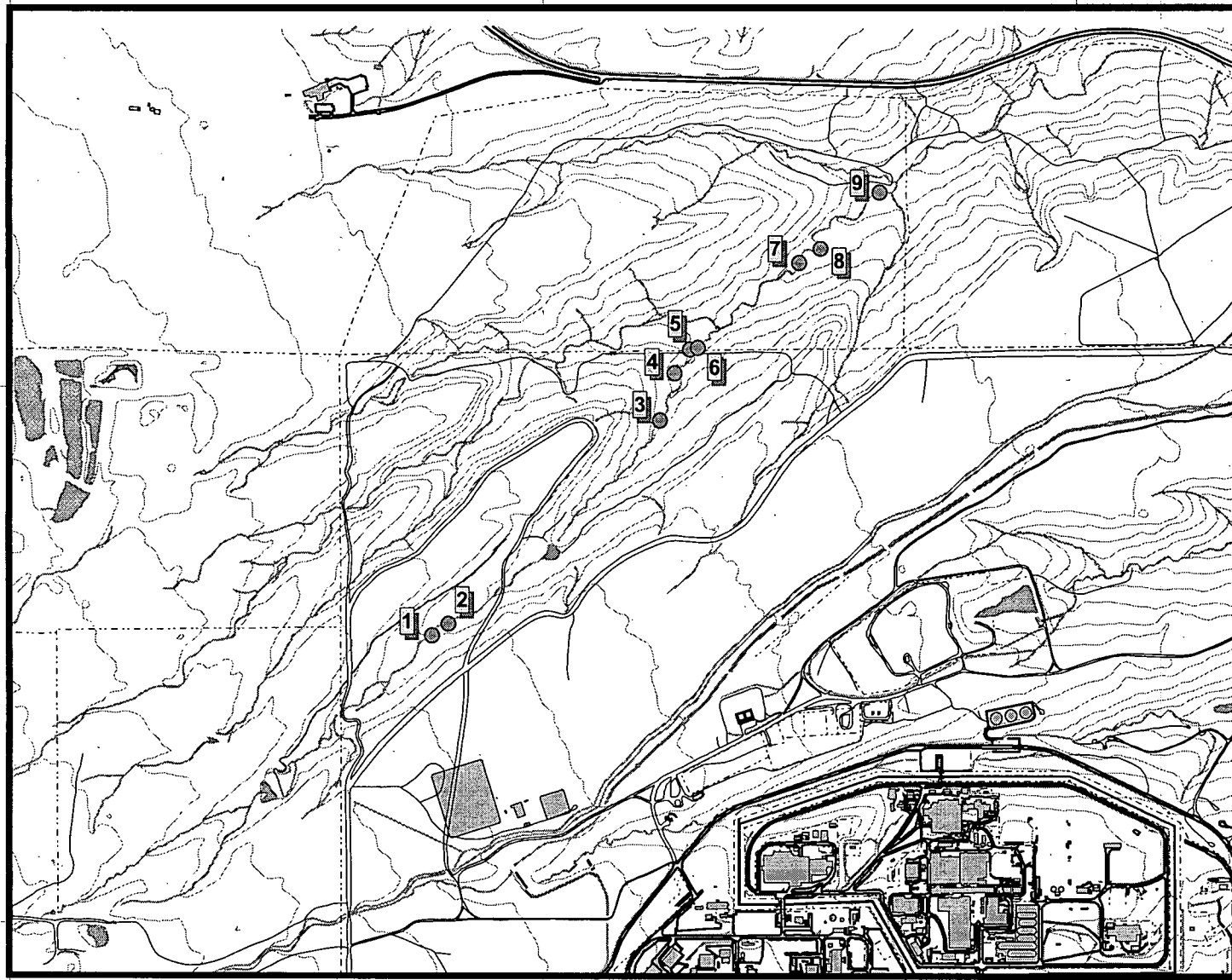
750000

750000

2075000

2080000

2085000



Fish sampling locations in Rock Creek.

Figure 2-3.

LEGEND

- Fish sampling locations

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- - - Fences
- Paved roads
- Dirt roads
- Contours (20 ft)

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other
structures from 1994 aerial flyover data
captured by EG&G RSL, Las Vegas.
Digitized from the orthorectified, 1985
Hypsography derived from digital elevation model
(DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN
and LATTICE to process the DEM data to create 5-foot contours.
The DEM data was captured by the Remote Sensing Lab,
Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution.
The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
Sample locations provided by Exponent.
K-H Ecology Group POC: Karan North 303-966-6876.



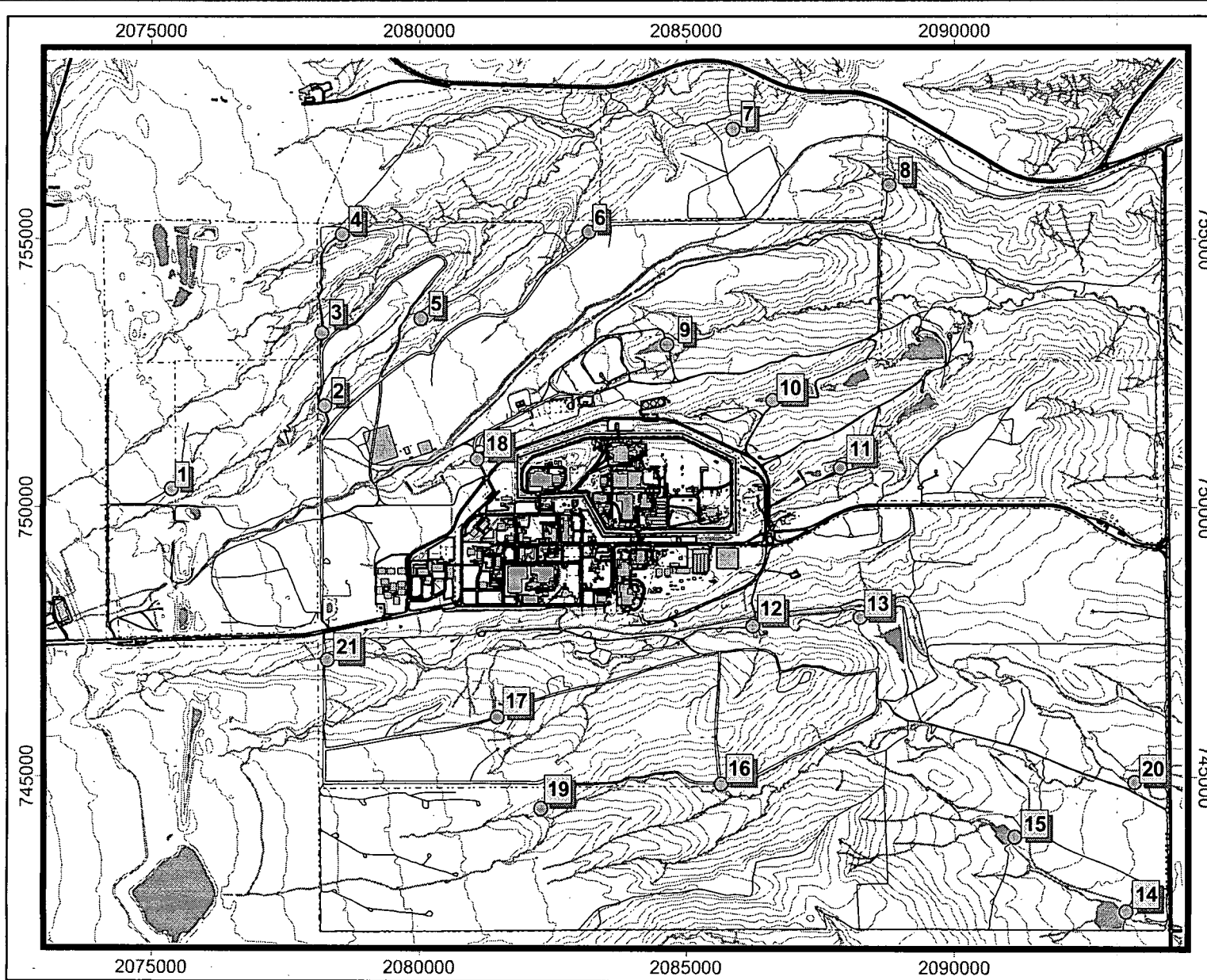
1:18406

500 0 500 1000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
RFETS GIS Dept. 303-966-7707
MAP ID: 01-0565 May 16, 2001



2000 Boreal chorus frog monitoring locations.

Figure 2-4.

LEGEND

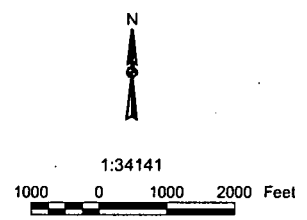
Monitoring locations

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads
- Contours (20 ft)

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by ES&S RSL, Las Vegas. Digitized from the orthophotography, 1/85. Hydrography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

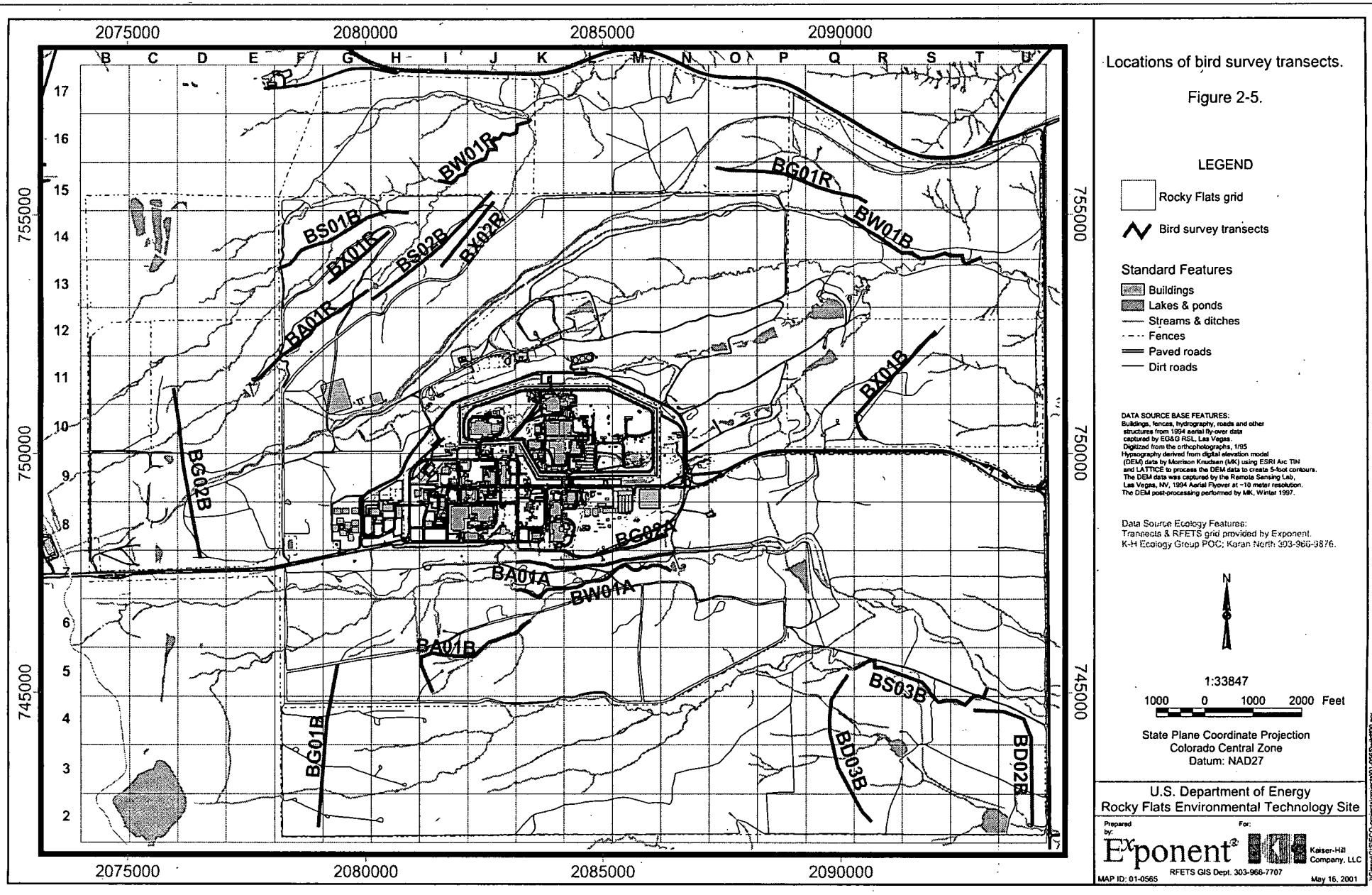
Data Source Ecology Features:
Sample locations provided by Exponent.
K-H Ecology Group POC, Karan North 303-966-9876.

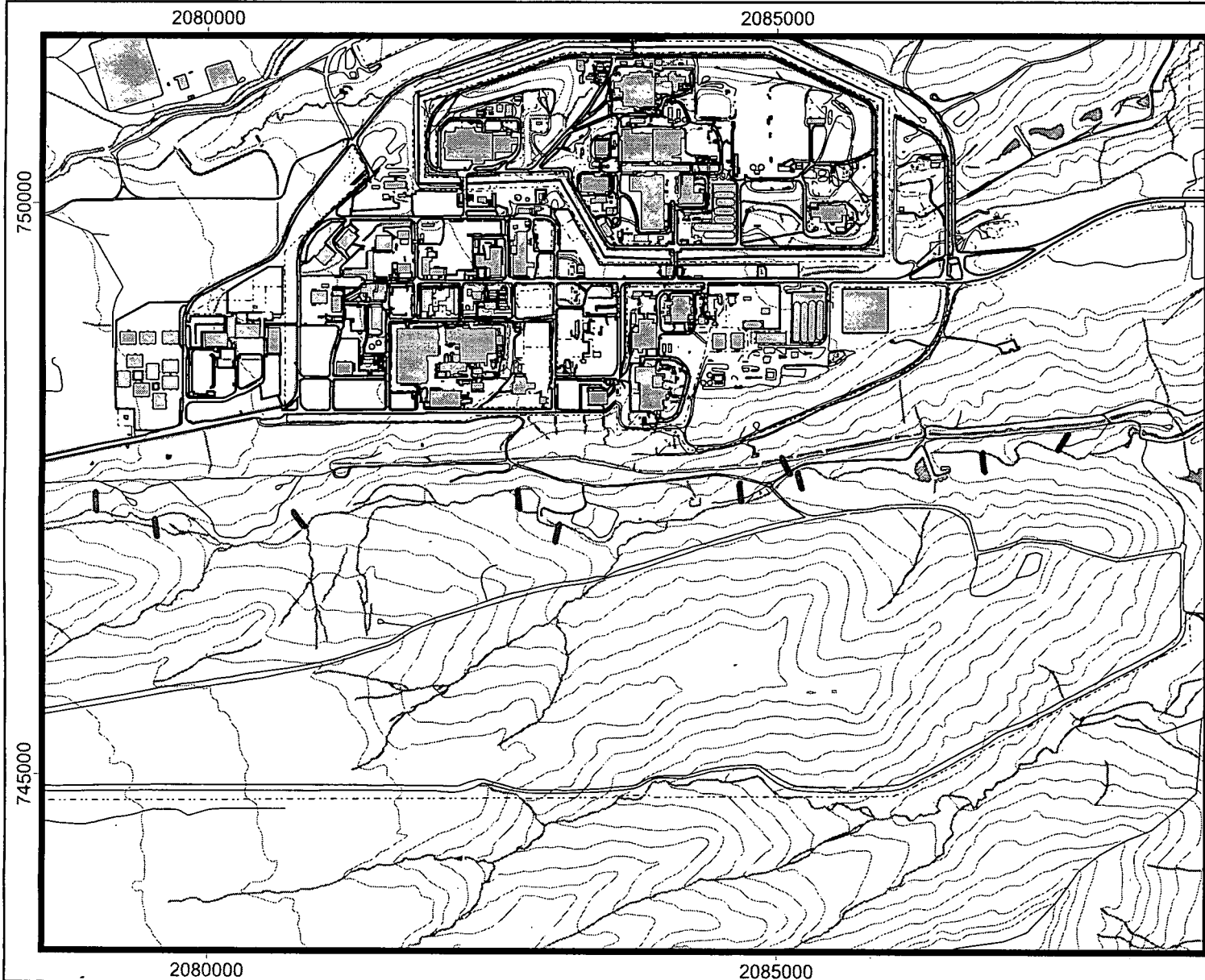


State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
 MAP ID: 01-0565 RFETS GIS Dept. 303-966-7707 May 24, 2001





Locations of Preble's mouse
habitat characterization transects.

Figure 2-6.

LEGEND

— Habitat Characterization Transect

Standard Features

- Lakes & ponds
- Streams & ditches
- Fences
- == Paved roads
- Dirt roads
- Contours (20 ft)

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs, 1995
Hypsography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
Habitat transect data provided by Exponent.
K-H Ecology Group POC: Karan North 303-966-6676.



1:16319

500 0 500 1000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
RFETS GIS Dept. 303-966-7707
MAP ID: 01-0565 May 23, 2001

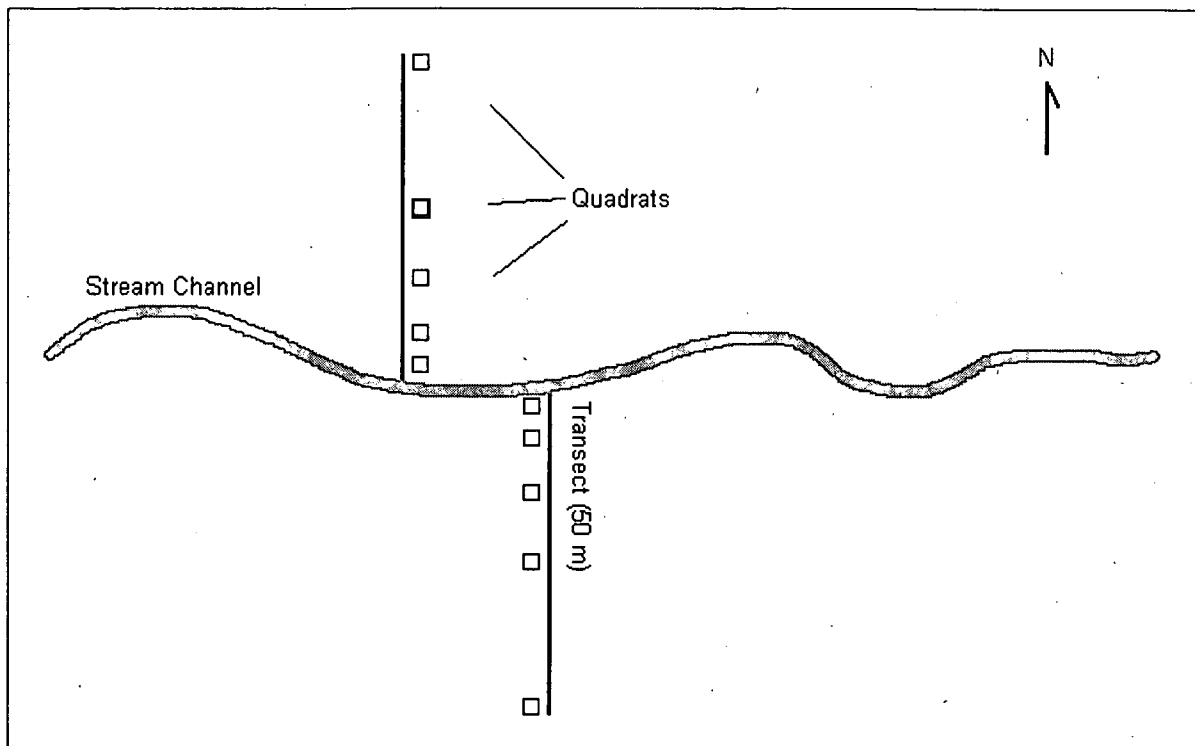
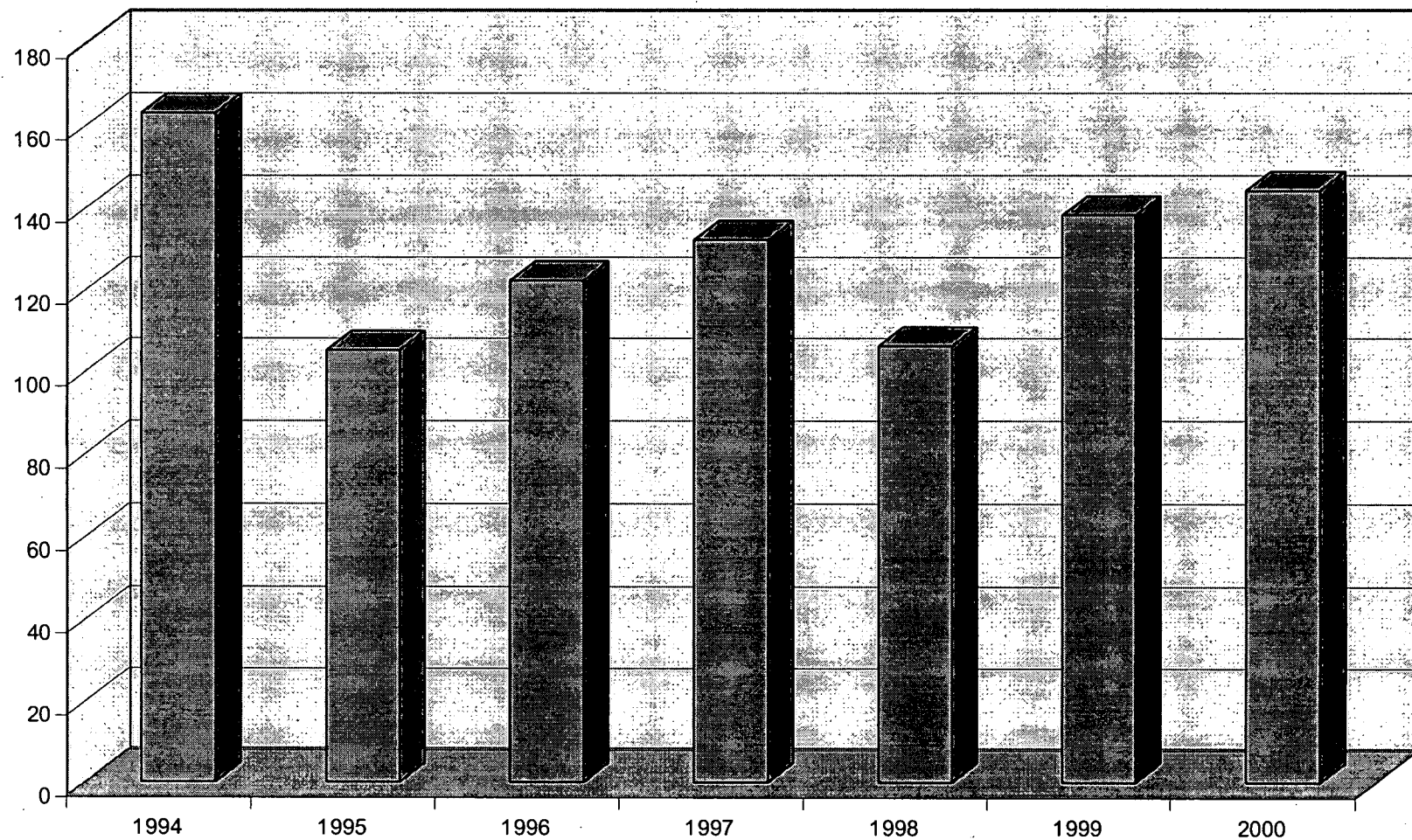
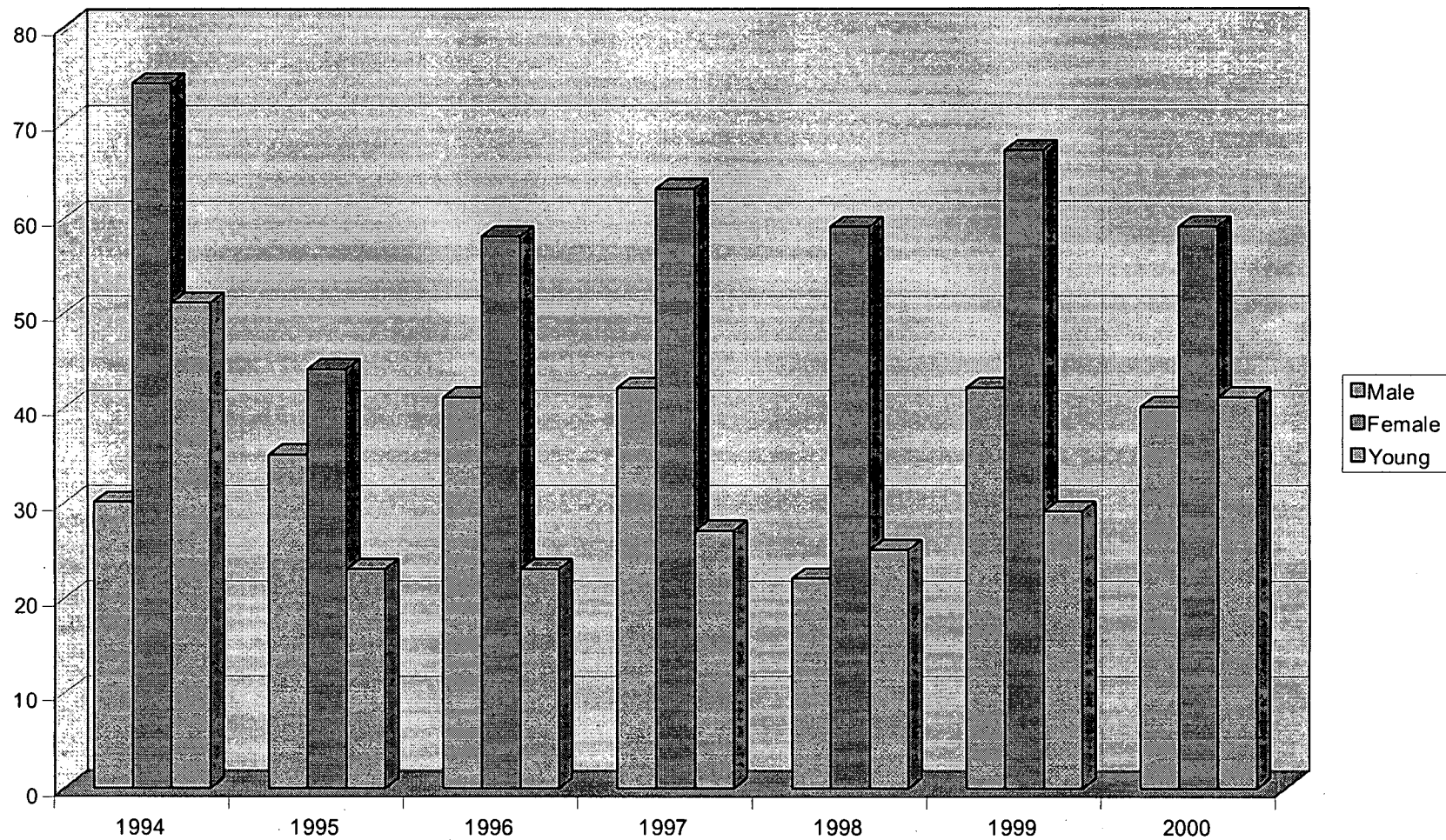


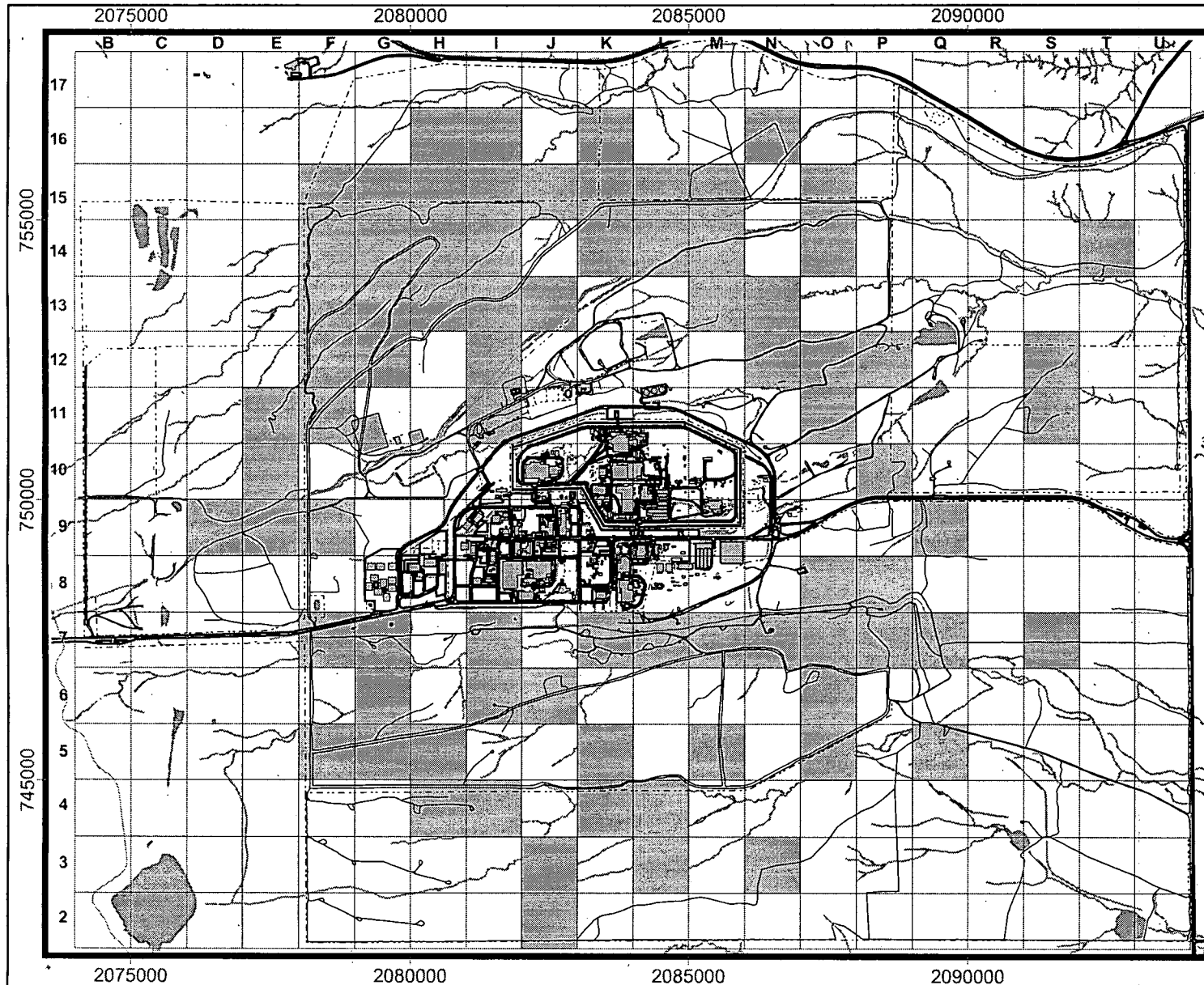
Figure 2-7. Illustration of quadrat placement for Preble's mouse habitat characterization transects.

FIGURE 3-1. TOTAL NUMBERS OF MULE DEER IN WINTER (1994-2000)



**FIGURE 3-2. ANNUAL MULE DEER POPULATION COMPARISONS FROM WINTER COUNTS
(1994-2000)**





Spring mule deer use areas
from combined data 1997-2000.

Figure 3-3.

LEGEND

- Rocky Flats grid
- Area of recorded mule deer use

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by ED&G RSL, Las Vegas. Digitized from the orthophotographs, 1/95. Hydrography derived from digital elevation model (DEM) data by Mountain Knutson (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
RFETS grid & deer use patterns provided by Exponent, K-H Ecology Group POC: Karan North 303-966-9876.



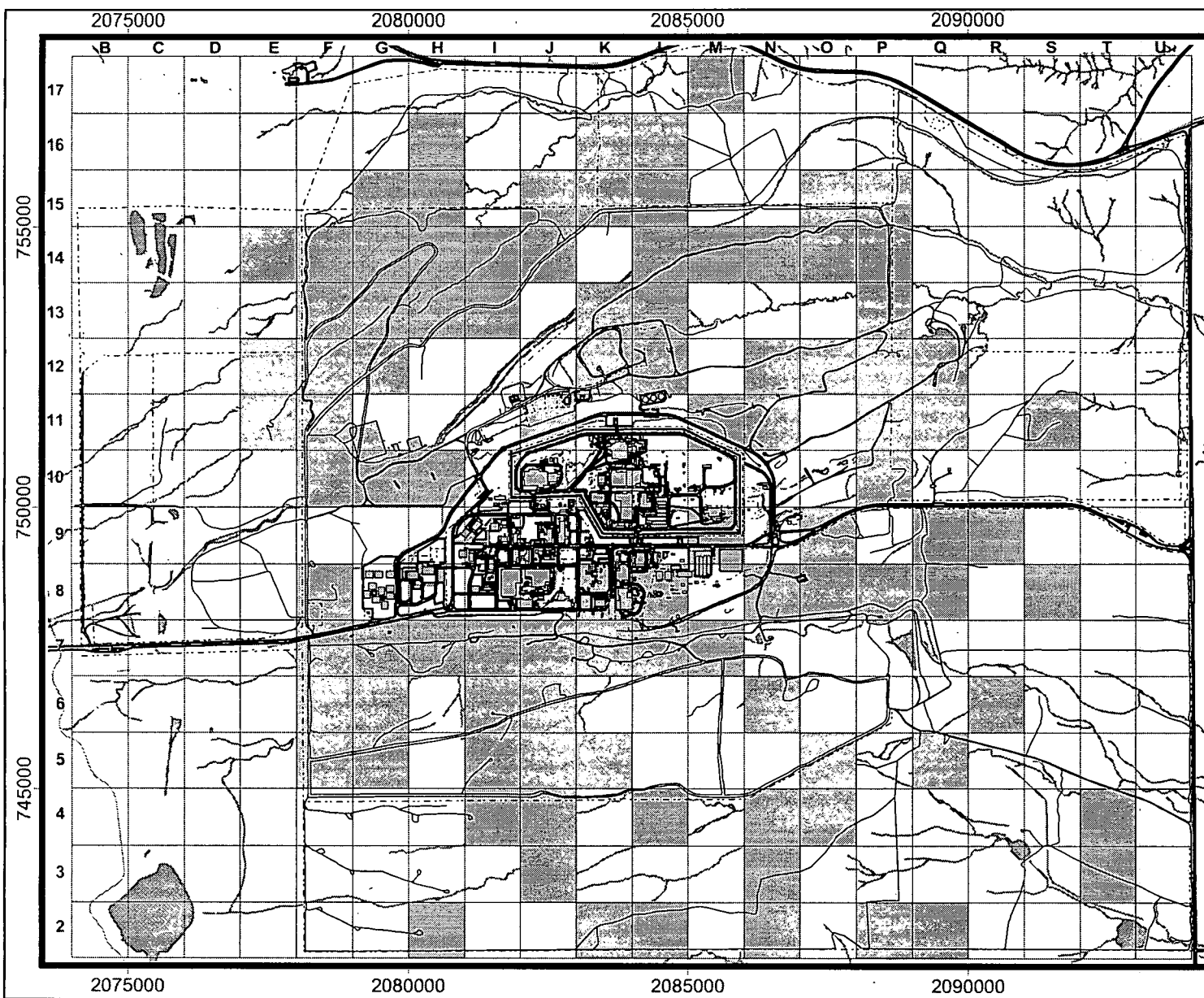
1:33444

1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
RFETS GIS Dept. 303-966-7707
MAP ID: 01-0565 May 23, 2001



Summer mule deer use areas
from combined data 1997-2000.

Figure 3-4.

LEGEND

- Rocky Flats grid
- Area of recorded mule deer use

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs, 1995. Hydrography derived from digital elevation model (DEM) data by Mortenson Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at 10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
RFETS grid & deer use patterns provided by Exponent, K-H Ecology Group POC: Keran North 303-966-9876.



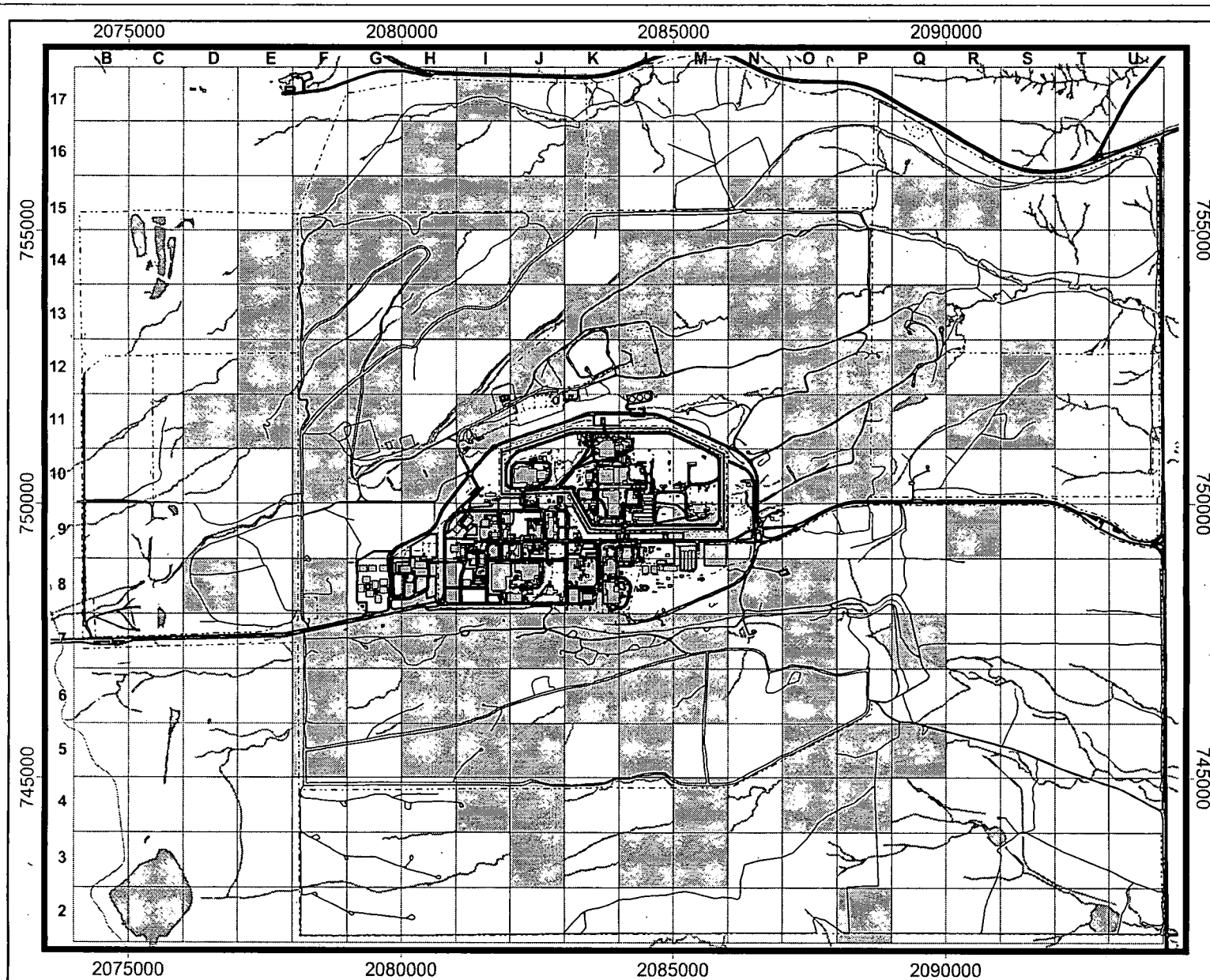
1:33444

1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
RFETS GIS Dept. 303-966-7707
MAP ID: 01-0565 May 23, 2001



Fall mule deer use areas
from combined data 1997-2000.

Figure 3-5.

LEGEND

- Rocky Flats grid
- Area of recorded mule deer use

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1995. Hydrography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remotely Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
RFETS grid & deer use patterns provided by Exponent. K-H Ecology Group POC; Karan North 303-966-9876.



1:33444

1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**

MAP ID: 01-0565 RFETS GIS Dept. 303-966-7707 May 23, 2001



Winter mule deer use areas
from combined data 1997-2000.

Figure 3-6.

LEGEND

- Rocky Flats grid
- Area of recorded mule deer use

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial flyover data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs, 1995
Hydrography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours.
The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~15 meter resolution.
The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
RFETS grid & deer use patterns provided by Exponent, K-H Ecology Group POC, Karan North 303-966-9876.

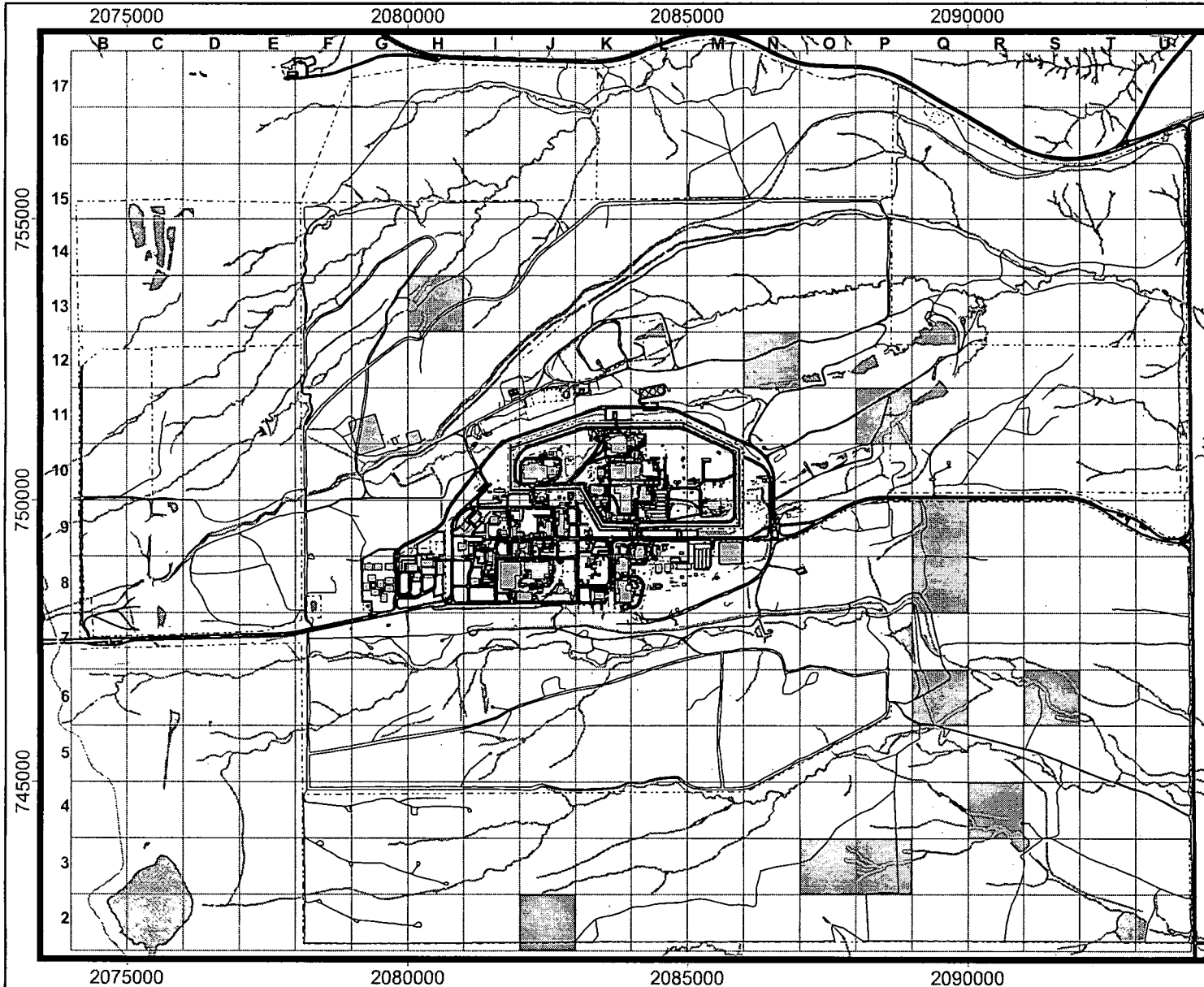


1:33444
1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
RFETS GIS Dept. 303-966-7707
MAP ID: 01-0565 May 23, 2001



Area use by white-tailed deer
in 2000.

Figure 3-7.

LEGEND

- Rocky Flats grid
- Area of recorded white-tail deer use

Standard Features

- Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by ED&G RSL, Las Vegas. Digitized from the orthophotographs, 1995. Hydrography derived from digital elevation model (DEM) data by Mortenson Knutson (MK) using ESRI Arc TIN and LATICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at 10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:
RFETS grid & deer use patterns provided by Exponent. K-H Ecology Group POC: Keran North 303-966-9876.



1:33427

1000 0 1000 2000 Feet

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**
RFETS GIS Dept. 303-966-7707
MAP ID: 01-0565 May 23, 2001

FIGURE 3-8. COMPARISON OF WATERFOWL SPECIES NUMBERS RECORDED AT ROCKY FLATS ANNUALLY (1993-2000)

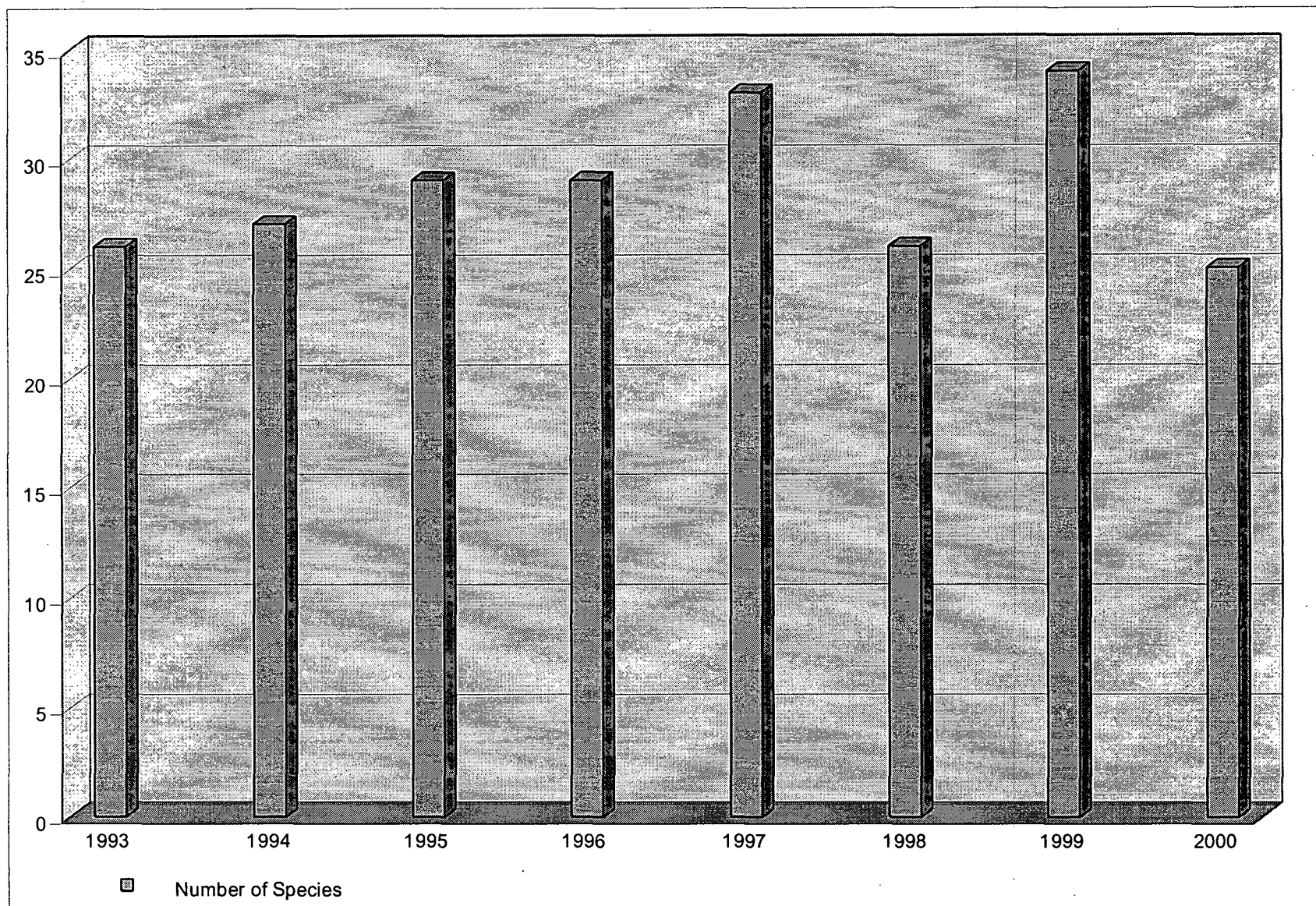


FIGURE 3-9. COMPARISON OF RAPTOR SPECIES NUMBERS RECORDED AT ROCKY FLATS ANUALLY (1993-2000)

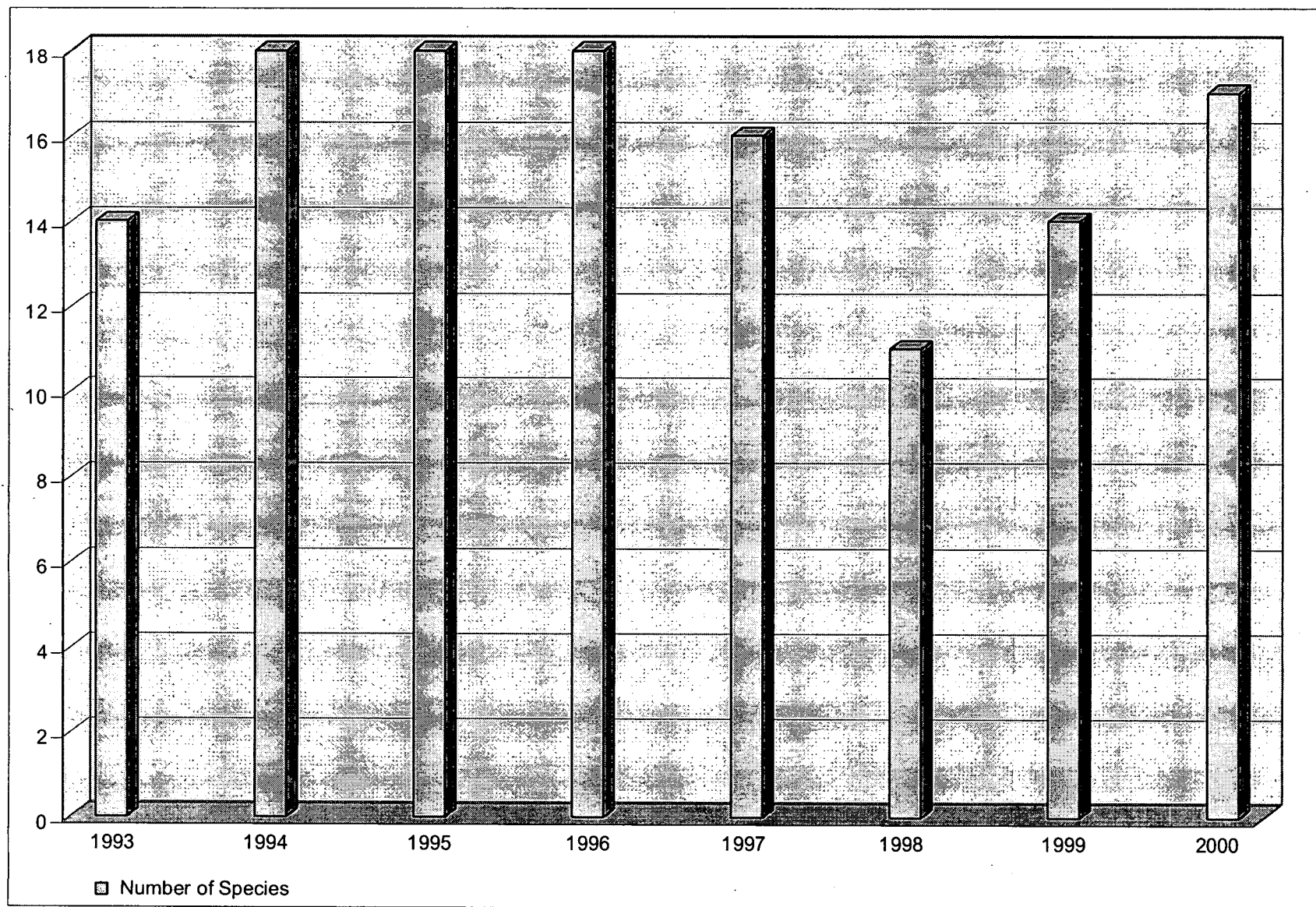
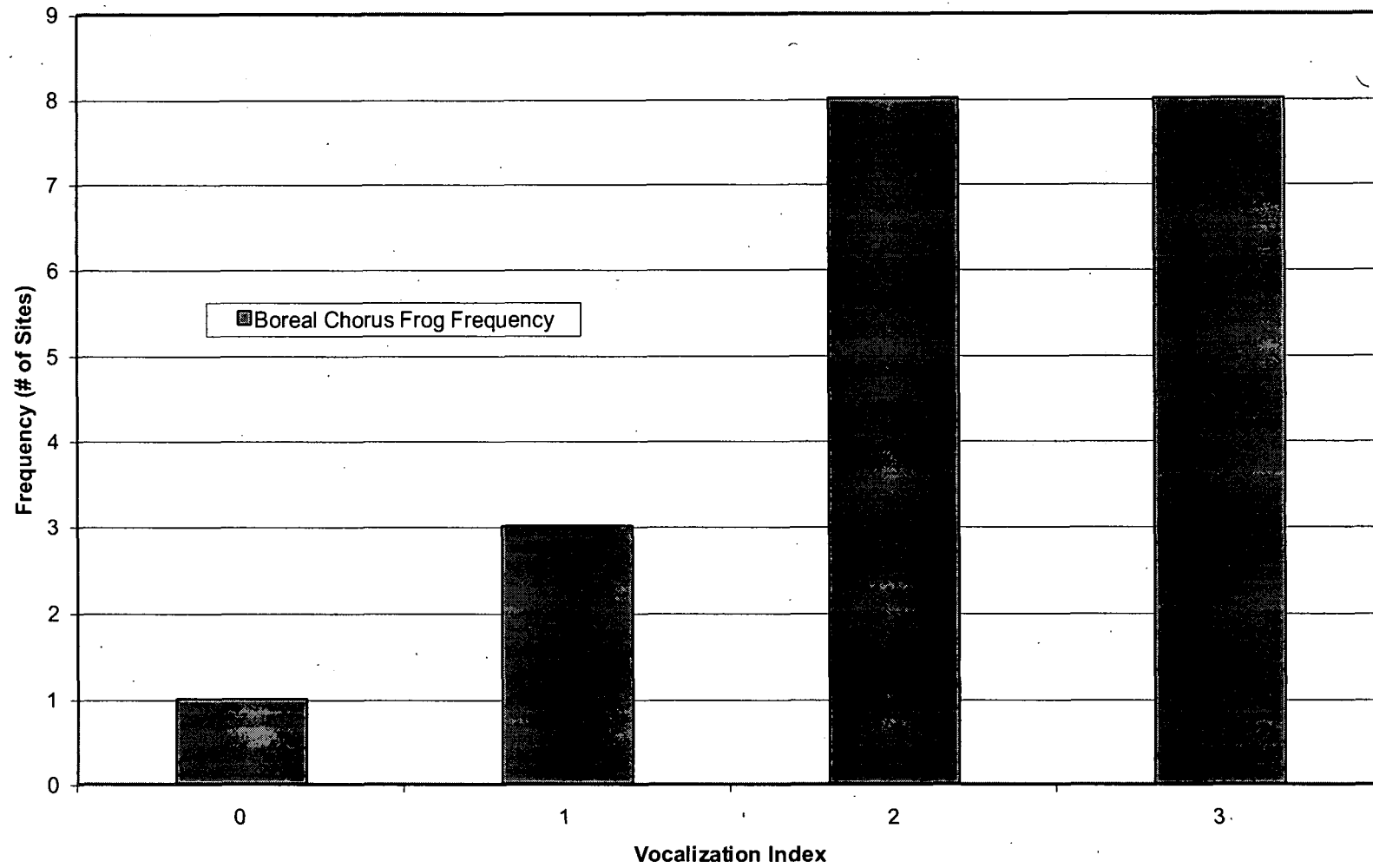


Figure 3-10. 2000 Boreal Chorus Frog Vocalization Index Frequency Summary



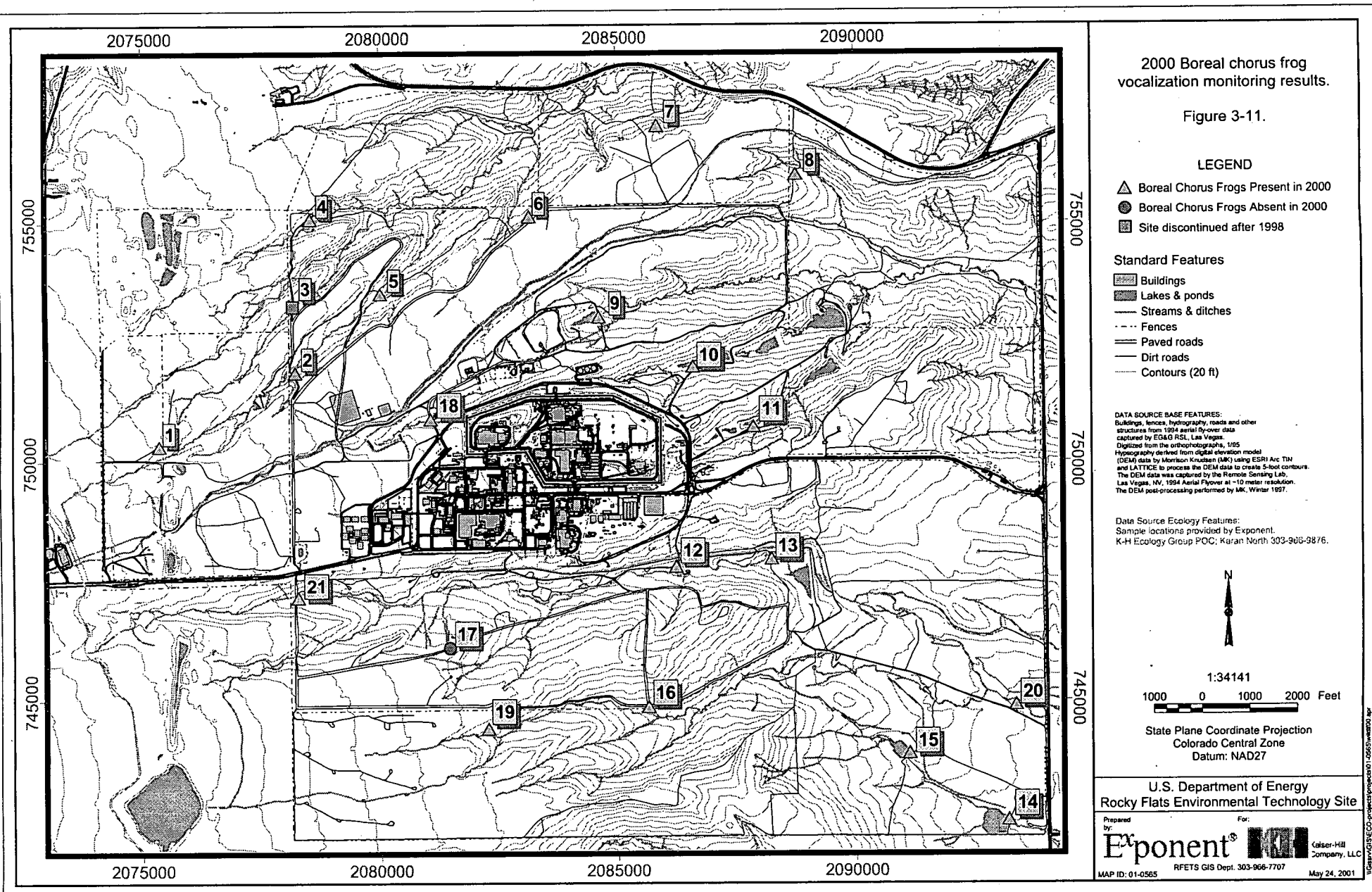
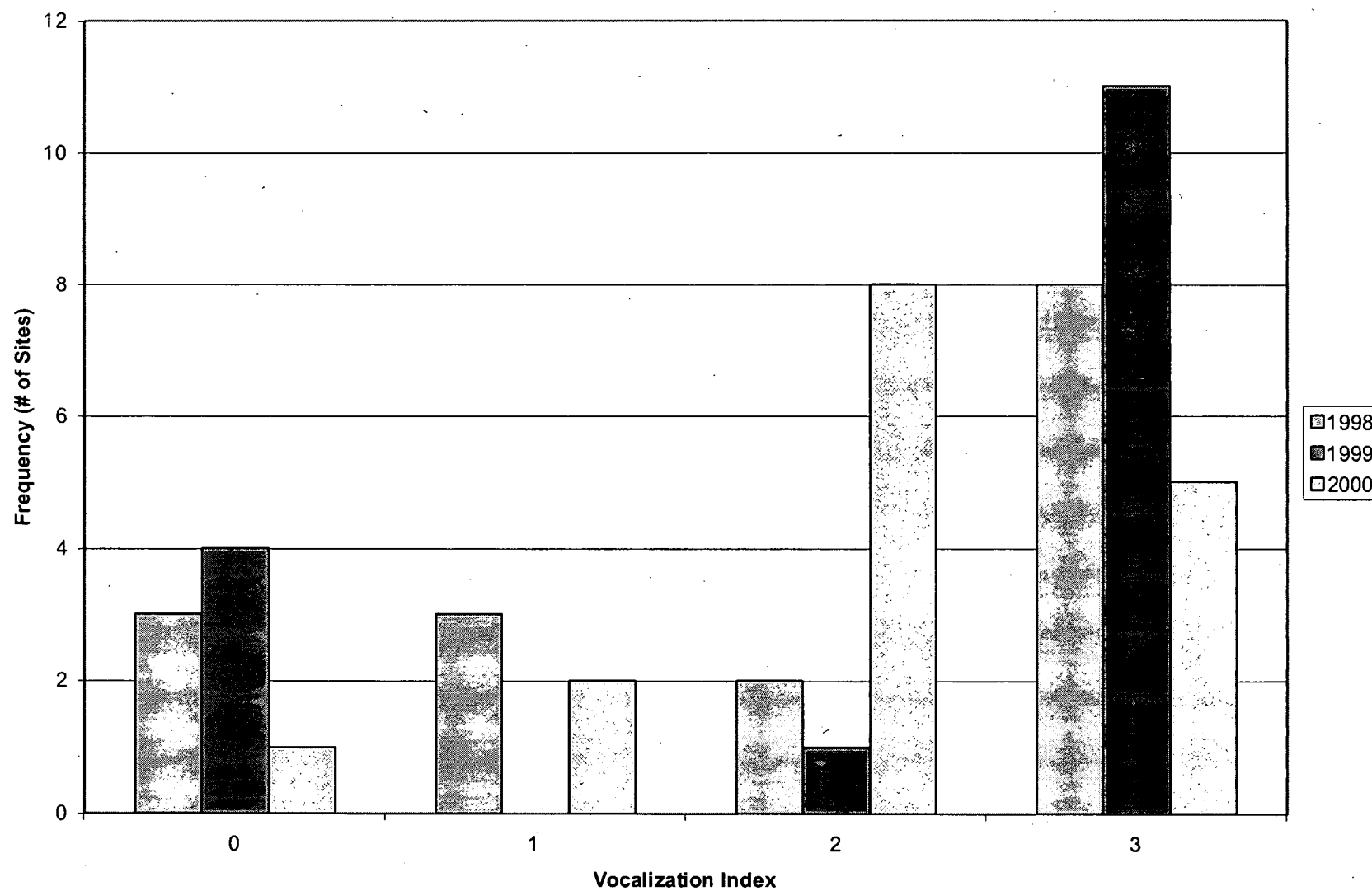


Figure 3-12. 1998-2000 Boreal Chorus Frog Frequency Summary



Frequency data based only on the 16 locations sampled in common across all three years.

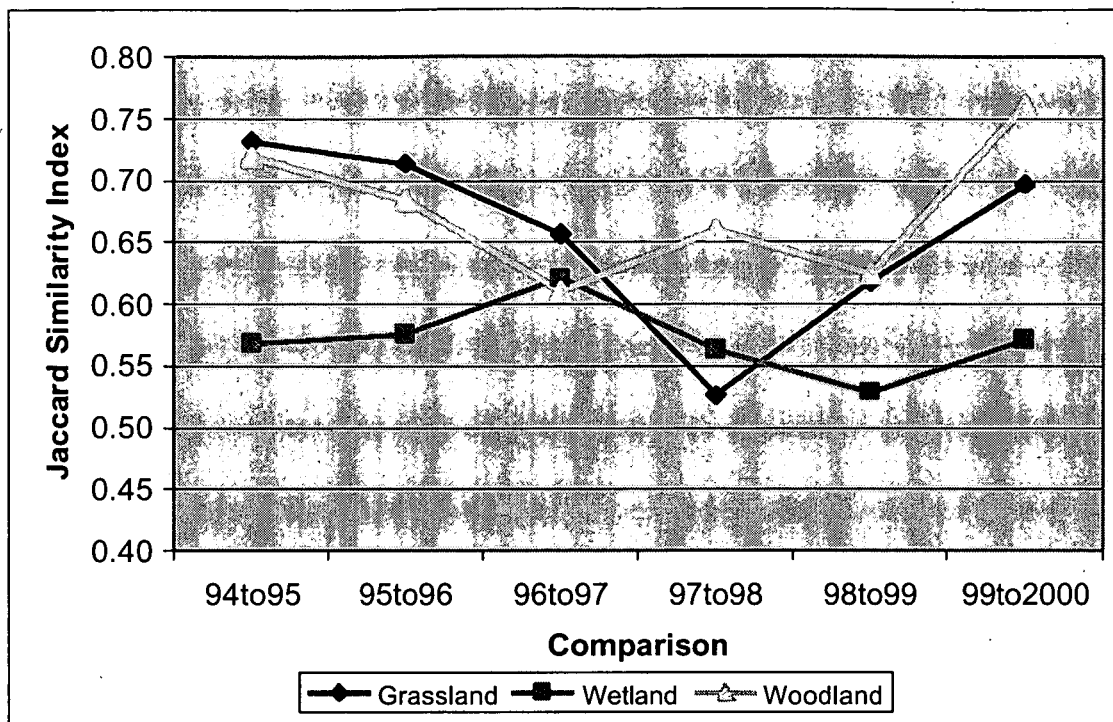


Figure 3-13. Sequential, within-habitat similarity of June bird species composition.

Note: Higher numbers indicate greater similarity from one year to the next.

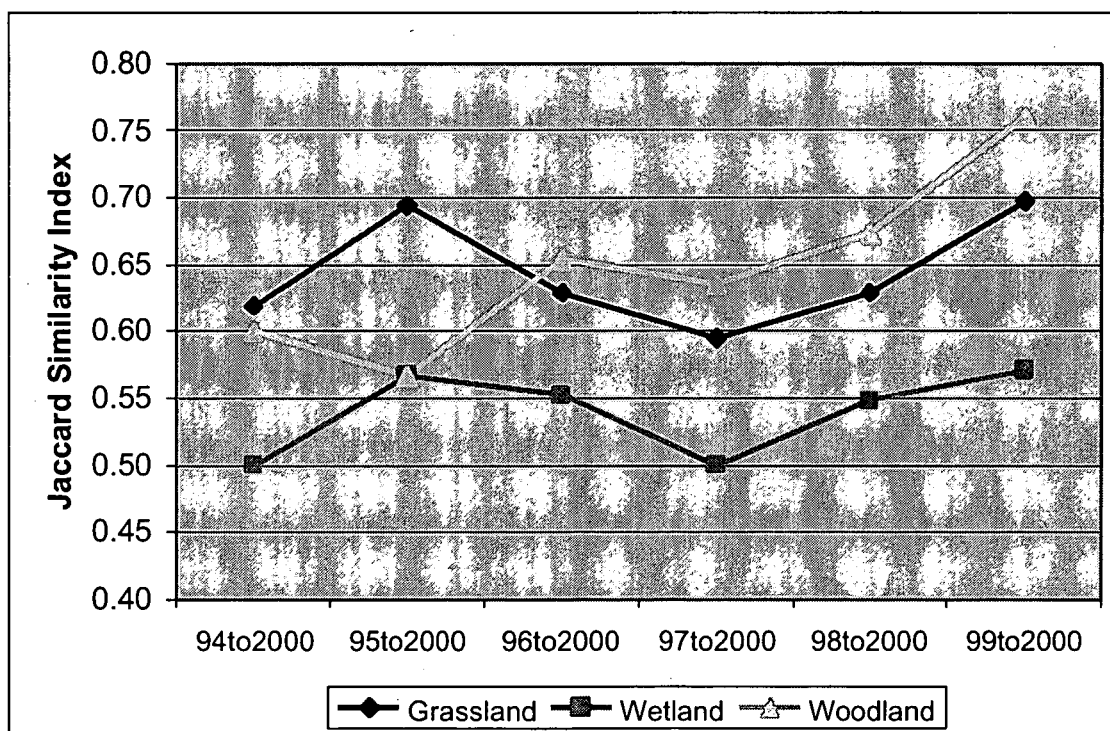


Figure 3-14. Within-habitat comparisons of 2000 June bird species composition to earlier years.

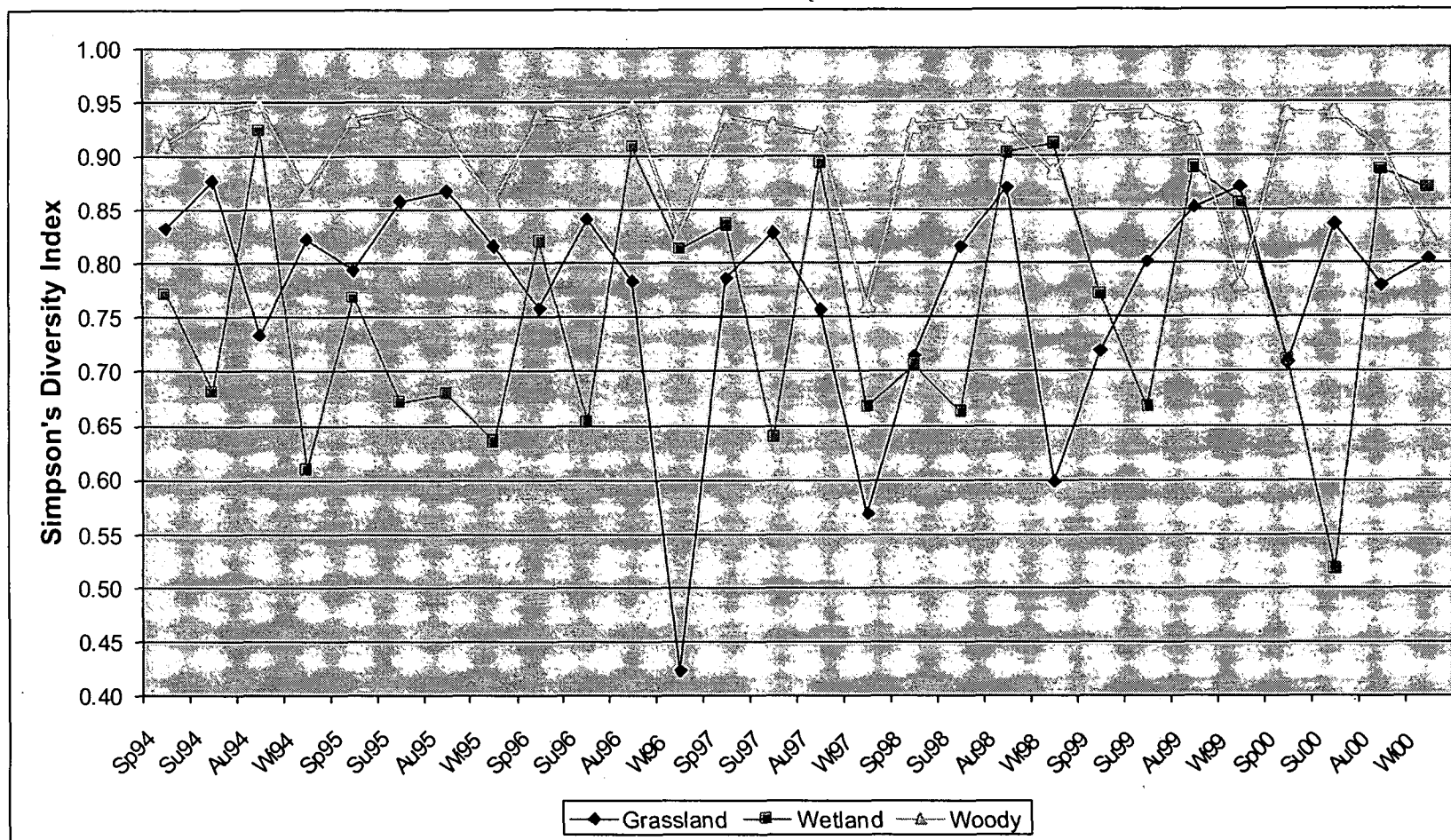
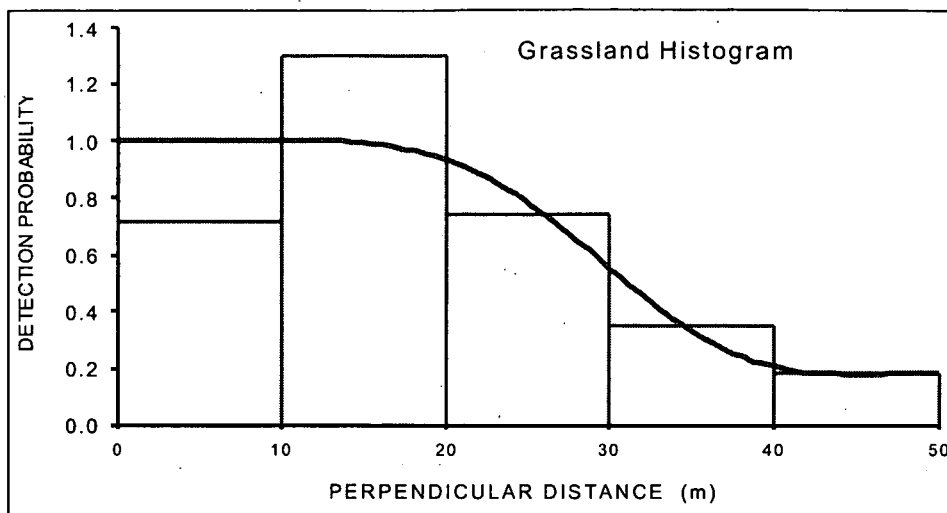
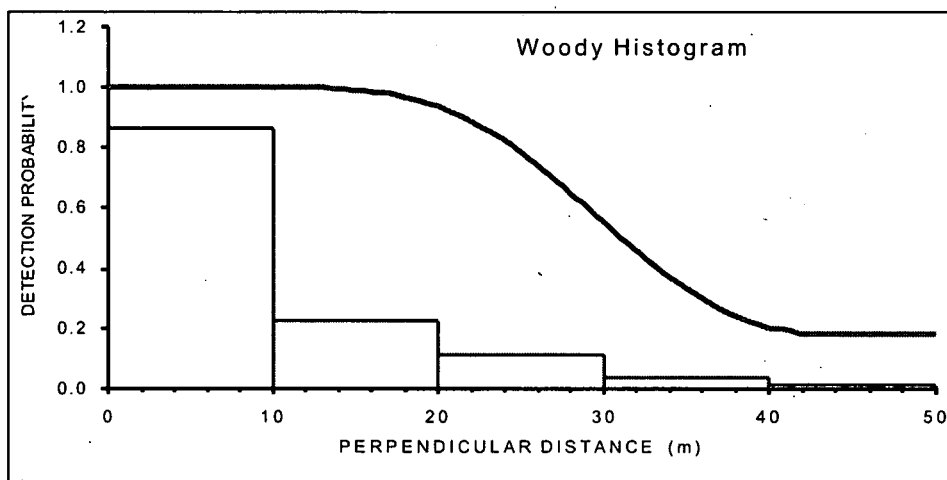


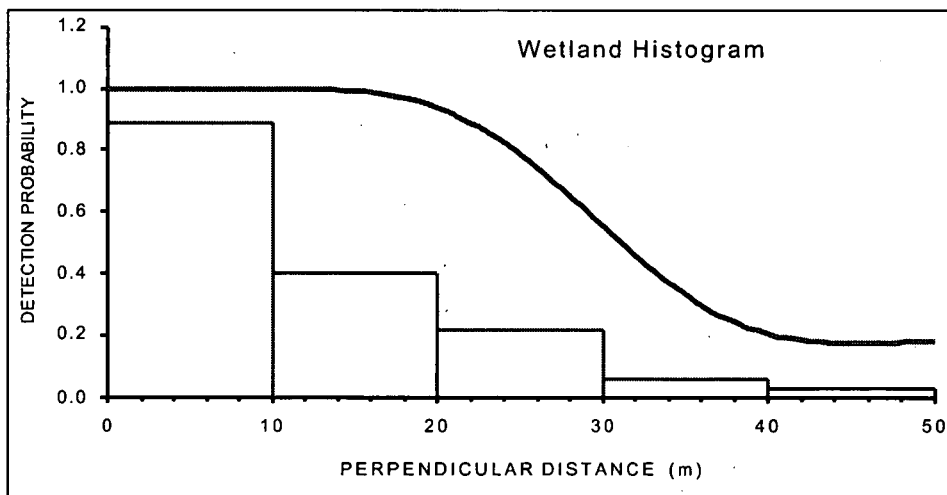
Figure 3-15. Simpson's diversity index calculated for each season for the major habitat types from spring 1994 through winter 2000.



a



b



c

Figure 3-16 (a-c). Demonstration of artificial skewness that favors certain distance categories due to Site survey method.

Note: The red line shows the ideal detection curve. Grasslands are skewed to the 10-20 m category (a), and woody and wetland habitats are skewed to the 0-5 m category (b,c).

Tables

Table 2-1. Multi-species census survey transect descriptions

Transect	
Number	Dominant Habitats Along Transect
RA01B	Wet Meadow (010), Short Marsh (020), Tall Marsh (030), Impoundment (054), Stream
RA02A	Wet Meadow (010), Short Marsh (020), Tall Marsh (030)
RA02B	Tall Marsh (030), Impoundment (054), Stream Pool (043), Mudflats (093), Riparian Woodland (110), Riparian Shrubland-- <i>Salix</i> (212), Mesic Grassland (322)
RA03B	Wet Meadow (010), Short Marsh (020), Tall Marsh (030) Wet Meadow (010), Short Marsh (020), Tall Marsh (030), Impoundment (054), Recalimed
RA04B	Grassland (324)
RG01N	Mesic Mixed Grassland (322)
RG02A	Mesic Mixed Grassland (322)
RG02B	Xeric Mixed Grassland (323), Mesic Mixed Grassland (322)
RG03B	Xeric Mixed Grassland (323), Mesic Mixed Grassland (322)
RS01B	Tall Upland Shrubland (230), Mesic Mixed Grassland (322)
RS02B	Tall Upland Shrubland (230), Mesic Mixed Grassland (322), short Marsh (020)
RS03B	Riparian Woodland (110), Riparian Shrubland-- <i>Amorpha</i> (211), Mesic Grassland (322)
RW01A	Riparian Woodland (110), Riparian Shrubland-- <i>Salix</i> (212), Mesic Grassland (322)
RW01B	Riparian Woodland (110), Riparian Shrubland-- <i>Salix</i> (212), Mesic Grassland (322)
RW02B	Riparian Woodland (110), Riparian Shrubland-- <i>Salix</i> (212), Mesic Grassland (322)
RW03B	Riparian Woodland (110), Riparian Shrubland-- <i>Salix</i> (212), Mesic Grassland (322)

Table 2-2. Special-concern species search list for the Rocky Flats Environmental Technology Site (effective date May 14, 2001)

Delisted Species Known to Occur at Rocky Flats

Birds

American Peregrine Falcon (*Falco peregrinus*)¹

Federal Threatened Species Known to Occur at Rocky Flats

Birds

Bald Eagle (*Haliaeetus leucocephalus*)^{2,3}

Mammals

Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*)^{2,5,6}

Federal Special-Concern Species Known to Occur at Rocky Flats

Reptiles

Eastern Short Horned Lizard (*Phrynosoma douglassii brevirostra*)^{4,8}

Birds

Northern Goshawk (*Accipiter gentilis*)^{4,8}

Baird's Sparrow (*Ammodramus bairdii*)^{4,8}

Western Burrowing Owl (*Athene cunicularia hypugea*)^{4,8,18}

Ferruginous Hawk (*Buteo regalis*)^{4,5,7}

Black Swift (*Cypseloides niger*)^{4,8}

Loggerhead Shrike (*Lanius ludovicianus*)^{4,5}

White-faced Ibis (*Plegadis chihi*)^{5,8}

Mammals

Small-footed Myotis (*Myotis subulatus* = *M. ciliolabrum*)^{4,8}

Black-tailed Prairie Dog (*Cynomys ludocivianus*)¹⁹

Colorado Species of Special Concern Known to Occur at Rocky Flats

Amphibians

Northern Leopard Frog (*Rana pipiens*)^{4,7}

Birds

Long-billed Curlew (*Numenius americanus*)^{7,8}

American White Pelican (*Pelecanus erythrorhynchos*)^{4,5,7}

Federal Endangered Species with Appropriate Habitat at Rocky Flats

Birds

Whooping Crane (*Grus americana*)¹²

Least Tern (*Sterna antillarum*)¹²

Piping Plover (*Charadrius melodus*)¹²

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)¹⁰

Mammals

Black-footed Ferret (*Mustela nigripes*)¹¹

Table 2-2 (cont.)

Federal Threatened Species with Appropriate Habitat at Rocky Flats

Plants

Ute Ladies'-tresses (*Spiranthes diluvialis*)¹²

Insects

Pawnee Montane Skipper (*Hesperia leonardus montana*)

Federal Proposed Species with Appropriate Habitat at Rocky Flats

Plants

Colorado Butterfly Plant (*Gaura neomexicana* var. *coloradensis*)¹³

Federal Candidate Species with Appropriate Habitat at Rocky Flats

Birds

Mountain Plover (*Charadrius montanus*)¹⁴

Federal Special-Concern Species with Appropriate Habitat at Rocky Flats

Plants

Bell's Twinpod (*Physaria bellii*)⁴

Tulip Gentian (*Eustoma grandiflora*)⁴

Adder's Mouth Orchid (*Malaxis brachypoda*)⁴

Insects

Regal Fritillary (*Speyeria idalia*)⁴

Fish

Plains Topminnow (*Fundulus sciadicus*)⁴

Birds

Western Snowy Plover (*Charadrius alexandrinus nivosus*)⁴

Black Tern (*Chlidonias niger*)⁴

Mammals

Spotted Bat (*Euderma maculatum*)⁴

Long-eared Myotis (*Myotis evotis*)⁴

Fringed Bat (*Myotis thysanodes*)⁴

Long-legged Myotis (*Myotis volans*)⁴

Pale Townsend's Big-eared Bat (*Plecotus townsendii pallescens*)⁴

Plains Spotted Skunk (*Spilogale putorius interrupta*)⁴

Swift Fox (*Vulpes velox*)^{11,4}

Colorado Threatened Species with Appropriate Habitat at Rocky Flats

Fish

Common Shiner (*Notropis cornutus*)¹⁴

Colorado Species of Special Concern with Potential Habitat at Rocky Flats

Fish

Stonecat (*Noturus flavus*)¹⁴

Table 2-2 (cont.)

Birds

- Barrow's Goldeneye (*Bucephala islandica*)¹⁴
Greater Sandhill Crane (*Grus canadensis tibida*)^{2,8}
Plains Sharp-tailed Grouse (*Tympanuchus phasianellus jamesi*)¹⁵

Watch-Listed Species Known to Occur at Rocky Flats

Reptiles

- Red-sided Garter (*Thamnophis sirtalis*)⁵
Western Yellowbelly Racer (*Cluber constrictor*)⁵

Birds

- Black-crowned Night-heron (*Nycticorax nycticorax*)¹⁶
American Bittern (*Botarus lentiginosus*)¹⁶
Bufflehead (*Bucephala albeola*)¹⁶
Eared Grebe (*Podoiceps nigricollis*)¹⁶
Sora (*Porzana carolina*)¹⁶
Cooper's Hawk (*Accipiter cooperii*)¹⁶
Sharp-shinned Hawk (*Accipiter striatus*)¹⁶
Golden Eagle (*Aquila chrysaetos*)¹⁶
Swainson's Hawk (*Buteo swainsoni*)¹⁷
Northern Harrier (*Circus cyaneus*)¹⁸
Merlin (*Falco columbarius*)¹⁶
Prairie Falcon (*Falco mexicanus*)¹⁶
Short-eared Owl (*Asio flammeus*)¹⁸
Long-eared Owl (*Asio otus*)¹⁶
Olive-sided Flycatcher (*Contopus borealis*)¹⁸
Chestnut-sided Warbler (*Dendroica pensylvanica*)¹⁸
Virginia's Warbler (*Vermivora virginiae*)¹⁸
Baird's Sparrow (*Ammodramus bairdi*)¹⁸
Grasshopper Sparrow (*Ammodramus savannarum*)¹⁸
Lark Bunting (*Calamospiza melanocorys*)¹⁸
Chestnut-collared Longspur (*Calcarius ornatus*)¹⁸
Field Sparrow (*Spizella pusilla*)¹⁸

Mammals

- Olive-backed Pocket Mouse (*Perognathus faciatu infraluteus*)¹⁶
Merriam's Shrew (*Sorex merriami*)¹⁶

NOTES:

1. The species *Falco peregrinus* was delisted by the U.S. Fish and Wildlife Service in 1999.
2. Colorado State threatened species (ST).
3. The USFWS has down-listed the bald eagle to threatened status.
4. In February 1996, the U.S. Fish and Wildlife Service (USFWS) revised the list of candidate species to include only proposed and C1 species. All former candidate species except C1 species are now classified unofficially as "at-risk" and are still considered special-concern species. The search-list includes these species because they may be upgraded to C-1 species at any time.

Table 2-2 (cont.)

5. This species is resident or regularly visits Rocky Flats.
6. In May 1998, the USFWS listed the Preble's meadow jumping mouse as a threatened species.
7. Colorado species of special concern (SC).
8. The species has been observed infrequently at Rocky Flats.
9. Listed on August 20, 1997.
10. Species was listed as a State threatened species May 8, 1998.
11. This species was collected previously near Rocky Flats.
12. These species have historically used areas in the vicinity, and suitable feeding or residential habitat exists at Rocky Flats.
13. Proposed for listing as threatened on March 24, 1998.
14. Federal candidate species for listing as threatened or endangered.
15. Colorado State endangered species.
16. Colorado Natural Heritage Program list of rare and imperiled species.
17. Species of special interest to the Colorado Division of Wildlife due to recent winter range die-off of the species.
18. Birds listed by the USFWS as "Migratory Nongame Birds of Management Concern: The 1995 List", that occur at the Site.
19. Although the U.S. Fish and Wildlife Service declined to list the black-tailed prairie dog in 2000, it has been added to the list of candidate species, and may be listed in the future.

Note: Candidate, proposed, and listed species lists are under constant revision. As data are reviewed by the USFWS, species are added to and removed from this list on a year-round basis. This list for Rocky Flats Environmental Technology Site is updated annually.

Sources:

1. Colorado Natural Heritage Program 1999 List of Rare and Imperiled Animals, Plants, and Natural Communities.
2. Federal Register, February 28, 1996, pp. 7596-7613.
3. Migratory Nongame Birds of Management Concern in the United States: The 1995 List.

Table 2-3. Bird survey transect descriptions

Transect Number	Transect Length	Dominant Habitats Along Transect
BA01A	1000 m	Tall Marsh (030)
BA01B	1000 m	Wet Meadow (010), Short Marsh (020), Tall Marsh (030), Stream
BA01R	1000 m	Wet Meadow (010), Short Marsh (020), Tall Marsh (030), Stream
BD02B	1000 m	Reclaimed Grassland (324)
BD03B	1000 m	Reclaimed Grassland (324)
BG01B	1000 m	Xeric Grassland (323)
BG01R	1000 m	Mesic Grassland (322)
BG02A	1000 m	Mesic Grassland (322), Reclaimed Grassland (324)
BG02B	1000 m	Xeric Grassland (323), Mesic Grassland (322)
BR02A	500 m	Reclaimed Grassland (324) Now Cancelled Due to New Postings
BS01B	1000 m	Tall Upland Shrubland (230), Mesic Grassland (322)
BS02B	1000 m	Short Marsh (020), Tall Upland Shrubland (230), Mesic Grassland
BS03B	1000 m	<i>Amorpha</i> Riparian Shrubland (211), Riparian Woodland (110)
BW01A	1000 m	Riparian Woodland (110), <i>Salix</i> Riparian Shrubland (212)
BW01R	1000 m	Riparian Woodland (110), <i>Salix</i> Riparian Shrubland (212)
BX01R	500 m	Xeric Grassland (323)
BX02R	500 m	Xeric Grassland (323)
BX01B	1000 m	Xeric Grassland (323)
BW01B	1000 m	Riparian Woodland (110), <i>Salix</i> Riparian Shrubland (212)

Table 2-4. Preble's mouse habitat characterization parameters

Parameter	Variables	Method
Distance to canopy edge	Nearest contiguous riparian canopy. Does not include snowberry, rose, or skunkbush sumac (m)	Meter tape
Dominant associations	Primary, secondary	RFETS codes
Foliar cover	Percent for tree, shrub, subshrub, grass, forb	Cover classes
Moisture gradient	Hydric, humic, mesic, xeric	Visual estimate
Quadrat canopy position	In, out, edge	Visual estimate
Shrub canopy species	Species code	RFETS codes
Slope angle	0-90°	Clinometer
Slope aspect	360°	Compass
Slope position	Piedmont, top, upper, middle, bottom, riparian	Visual estimate
Soil texture	Cobbly, gravelly, sandy, loamy, silty, clayey	Visual estimate
Tree canopy species	Species code	RFETS codes
Veg. vertical density	Portion of m ² grid (%)	Vegetation board
Width of riparian vegetation	Measure from streambank to edge of hydric vegetation association (m)	Meter tape
Width of stream	Measure of open water or dry, unvegetated stream bed (m)	Meter tape

**Table 3-1. Seasonal Mule Deer use areas
(combined data from 1997-2000)**

Season	RF Grid N	RF Grid E	Total Number
Spring	2	J	20
Spring	3	J	17
Spring	3	L	6
Spring	3	N	24
Spring	4	H	2
Spring	4	I	15
Spring	4	K	31
Spring	4	L	8
Spring	5	F	9
Spring	5	G	16
Spring	5	H	3
Spring	5	K	22
Spring	5	M	9
Spring	5	O	4
Spring	5	Q	6
Spring	6	G	9
Spring	6	I	8
Spring	6	J	7
Spring	6	O	35
Spring	7	F	3
Spring	7	G	2
Spring	7	I	12
Spring	7	K	30
Spring	7	L	1
Spring	7	M	31
Spring	7	N	12
Spring	7	O	4
Spring	7	P	4
Spring	7	Q	13
Spring	7	S	6
Spring	8	O	3
Spring	8	P	2
Spring	9	D	10
Spring	9	E	8
Spring	9	F	20
Spring	9	Q	23
Spring	10	E	20
Spring	10	P	19
Spring	11	E	1
Spring	11	F	5
Spring	11	I	7
Spring	11	O	8
Spring	11	S	11
Spring	12	F	4
Spring	12	G	10
Spring	12	I	10
Spring	12	N	11

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Spring	12	O	5
Spring	12	P	10
Spring	12	S	2
Spring	13	F	25
Spring	13	G	5
Spring	13	H	39
Spring	13	I	6
Spring	13	J	21
Spring	13	M	3
Spring	13	N	3
Spring	14	F	18
Spring	14	G	5
Spring	14	H	18
Spring	14	I	1
Spring	14	K	16
Spring	14	L	15
Spring	14	M	1
Spring	14	O	15
Spring	14	T	7
Spring	15	F	2
Spring	15	G	30
Spring	15	H	6
Spring	15	I	23
Spring	15	J	37
Spring	15	K	16
Spring	15	L	14
Spring	15	M	4
Spring	15	O	19
Spring	16	H	16
Spring	16	I	3
Spring	16	K	2
Spring	16	N	6
Summer	2	H	1
Summer	2	K	2
Summer	2	L	2
Summer	2	N	2
Summer	2	P	1
Summer	2	Q	4
Summer	3	J	2
Summer	3	N	1
Summer	3	T	3
Summer	4	I	3
Summer	4	J	2
Summer	4	L	6
Summer	4	N	1
Summer	4	O	3
Summer	4	T	5

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Summer	5	F	2
Summer	5	G	1
Summer	5	I	1
Summer	5	J	4
Summer	5	K	2
Summer	5	O	4
Summer	5	Q	12
Summer	6	F	3
Summer	6	G	6
Summer	6	I	11
Summer	6	J	1
Summer	6	N	11
Summer	6	R	2
Summer	7	F	12
Summer	7	G	3
Summer	7	H	2
Summer	7	I	7
Summer	7	J	4
Summer	7	K	3
Summer	7	L	1
Summer	7	M	2
Summer	8	F	1
Summer	8	K	3
Summer	8	L	4
Summer	8	N	1
Summer	8	O	1
Summer	8	P	12
Summer	8	Q	2
Summer	8	S	1
Summer	9	M	3
Summer	9	O	3
Summer	9	Q	3
Summer	9	R	3
Summer	10	F	2
Summer	10	G	6
Summer	10	H	2
Summer	10	P	4
Summer	11	E	1
Summer	11	F	1
Summer	11	J	1
Summer	11	M	1
Summer	11	N	1
Summer	11	P	3
Summer	11	Q	1
Summer	11	S	2
Summer	12	E	2
Summer	12	F	2
Summer	12	G	1

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Summer	12	K	2
Summer	12	L	1
Summer	12	N	6
Summer	12	O	1
Summer	12	P	4
Summer	12	Q	4
Summer	13	F	32
Summer	13	G	7
Summer	13	H	13
Summer	13	I	1
Summer	13	K	2
Summer	13	L	2
Summer	13	P	6
Summer	14	E	6
Summer	14	F	9
Summer	14	G	7
Summer	14	H	11
Summer	14	I	1
Summer	14	J	6
Summer	14	L	1
Summer	14	M	1
Summer	14	N	2
Summer	14	O	2
Summer	14	P	1
Summer	15	G	4
Summer	15	H	6
Summer	15	J	2
Summer	15	K	3
Summer	15	L	8
Summer	15	O	4
Summer	15	P	6
Summer	16	H	4
Summer	16	K	2
Summer	16	L	3
Summer	17	M	1
Fall	2	P	6
Fall	3	J	4
Fall	3	L	3
Fall	3	M	3
Fall	4	I	11
Fall	4	J	6
Fall	4	M	3
Fall	4	O	6
Fall	4	P	1
Fall	5	F	7
Fall	5	H	11
Fall	5	I	16
Fall	5	J	28

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Fall	5	L	2
Fall	5	O	8
Fall	5	P	18
Fall	5	Q	1
Fall	6	F	1
Fall	6	H	16
Fall	6	I	5
Fall	6	K	3
Fall	6	L	1
Fall	6	M	3
Fall	6	O	14
Fall	7	F	5
Fall	7	G	9
Fall	7	H	8
Fall	7	I	1
Fall	7	I	2
Fall	7	J	12
Fall	7	J	1
Fall	7	K	8
Fall	7	K	4
Fall	7	L	3
Fall	7	L	2
Fall	7	L	2
Fall	7	M	7
Fall	7	O	16
Fall	7	Q	4
Fall	8	D	1
Fall	8	F	1
Fall	8	H	7
Fall	8	K	3
Fall	8	N	10
Fall	8	O	1
Fall	9	I	4
Fall	9	M	2
Fall	9	R	4
Fall	10	F	2
Fall	10	H	2
Fall	10	O	14
Fall	10	P	2
Fall	11	D	2
Fall	11	E	17
Fall	11	F	3
Fall	11	G	1
Fall	11	I	1
Fall	11	O	6
Fall	11	P	6
Fall	11	R	2
Fall	11	S	1
Fall	12	E	27

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Fall	12	F	9
Fall	12	G	1
Fall	12	J	4
Fall	12	L	5
Fall	12	O	6
Fall	12	P	21
Fall	12	Q	10
Fall	12	S	1
Fall	13	E	2
Fall	13	F	5
Fall	13	H	9
Fall	13	I	2
Fall	13	K	23
Fall	13	L	4
Fall	13	N	8
Fall	13	O	10
Fall	13	Q	3
Fall	14	E	9
Fall	14	F	7
Fall	14	G	4
Fall	14	H	1
Fall	14	J	6
Fall	14	L	16
Fall	14	M	1
Fall	14	N	2
Fall	14	O	5
Fall	15	F	15
Fall	15	G	10
Fall	15	H	20
Fall	15	I	5
Fall	15	J	11
Fall	15	K	10
Fall	15	N	2
Fall	15	O	1
Fall	15	Q	6
Fall	15	R	1
Fall	16	H	2
Fall	16	K	15
Fall	17	I	4
Winter	2	L	6
Winter	3	I	21
Winter	3	L	25
Winter	3	L	14
Winter	3	M	25
Winter	3	O	4
Winter	4	J	1
Winter	4	K	22

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Winter	4	L	30
Winter	4	N	15
Winter	5	K	29
Winter	5	L	10
Winter	5	M	21
Winter	5	N	2
Winter	5	O	1
Winter	5	T	25
Winter	6	I	8
Winter	6	O	19
Winter	6	P	1
Winter	6	T	3
Winter	7	G	29
Winter	7	H	34
Winter	7	I	34
Winter	7	J	52
Winter	7	K	6
Winter	7	O	2
Winter	7	P	6
Winter	7	Q	21
Winter	7	R	1
Winter	7	T	13
Winter	8	J	3
Winter	8	L	9
Winter	8	M	9
Winter	8	N	5
Winter	8	O	20
Winter	8	Q	17
Winter	8	R	6
Winter	9	E	4
Winter	9	N	10
Winter	9	Q	15
Winter	9	S	7
Winter	10	F	11
Winter	10	G	20
Winter	10	H	5
Winter	10	O	11
Winter	10	Q	3
Winter	10	R	7
Winter	10	T	5
Winter	11	C	6
Winter	11	D	18
Winter	11	G	19
Winter	11	L	13
Winter	11	O	15
Winter	11	P	16
Winter	11	S	17
Winter	12	G	1

Table 3-1. (cont.)

Season	RF Grid N	RF Grid E	Total Number
Winter	12	J	13
Winter	12	M	4
Winter	12	N	10
Winter	12	O	34
Winter	12	P	1
Winter	12	S	14
Winter	12	T	15
Winter	13	E	11
Winter	13	F	26
Winter	13	H	13
Winter	13	K	16
Winter	13	L	11
Winter	13	N	65
Winter	13	S	2
Winter	14	F	12
Winter	14	G	20
Winter	14	H	4
Winter	14	J	32
Winter	14	L	6
Winter	14	N	25
Winter	14	O	42
Winter	14	P	2
Winter	14	R	8
Winter	14	S	32
Winter	14	T	27
Winter	14	U	16
Winter	15	G	17
Winter	15	J	3
Winter	15	L	5
Winter	15	N	10
Winter	15	O	21
Winter	15	R	9
Winter	16	H	3
Winter	16	J	15
Winter	16	M	6
Winter	16	N	9
Winter	17	I	1
Winter	17	K	7

Note: Spec code - ODHE1; Total Number = all years

**Table 3-2. White-tailed Deer use areas
(combined data from 1997-2000)**

Season	RF Grid N	RF Grid E	Total Number
Spring	2	J	1
Spring	4	R	6
Spring	4	R	3
Spring	11	O	1
Spring	11	S	1
Spring	12	N	2
Spring	13	M	1
Spring	14	L	1
Spring	15	H	1
Spring	15	L	1
Summer	2	O	8
Summer	13	G	1
Summer	13	H	2
Summer	13	H	1
Fall	2	O	6
Fall	3	O	5
Fall	5	I	1
Fall	6	Q	2
Fall	6	S	5
Fall	12	P	1
Fall	15	H	1
Fall	15	J	1
Winter	2	O	13
Winter	3	P	9
Winter	4	R	7
Winter	7	T	4
Winter	8	Q	2
Winter	8	Q	2
Winter	9	Q	1
Winter	11	P	1
Winter	11	P	1
Winter	11	S	2
Winter	12	S	1
Winter	12	T	2
Winter	14	O	1
Winter	14	T	1

Note: Spec code - ODVI1; Total Number = all years

Table 3-3. Big game relative abundance in spring (1995-2000)

Year	Hab1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	20	Mule deer	ODHE1	2	75	0.0267	208	0.96	1273	0.1634
2000	30	Mule deer	ODHE1	13	120	0.1083	208	6.25	1273	0.1634
2000	110	Mule deer	ODHE1	91	341	0.2669	208	43.75	1273	0.1634
2000	212	Mule deer	ODHE1	8	103	0.0777	208	3.85	1273	0.1634
2000	230	Mule deer	ODHE1	58	184	0.3152	208	27.88	1273	0.1634
2000	322	Mule deer	ODHE1	36	146	0.2466	208	17.31	1273	0.1634
2000	110	White-tailed deer	ODVI1	4	341	0.0117	9	44.44	1273	0.0071
2000	230	White-tailed deer	ODVI1	3	184	0.0163	9	33.33	1273	0.0071
2000	322	White-tailed deer	ODVI1	2	146	0.0137	9	22.22	1273	0.0071
1999	10	Mule deer	ODHE1	3	37	0.0811	106	2.83	1302	0.0814
1999	20	Mule deer	ODHE1	10	104	0.0962	106	9.43	1302	0.0814
1999	110	Mule deer	ODHE1	33	301	0.1096	106	31.13	1302	0.0814
1999	230	Mule deer	ODHE1	15	147	0.1020	106	14.15	1302	0.0814
1999	322	Mule deer	ODHE1	8	181	0.0442	106	7.55	1302	0.0814
1999	323	Mule deer	ODHE1	28	139	0.2014	106	26.42	1302	0.0814
1999	324	Mule deer	ODHE1	9	25	0.3600	106	8.49	1302	0.0814
1998	20	Mule deer	ODHE1	6	121	0.0496	191	3.14	1263	0.1512
1998	110	Mule deer	ODHE1	44	337	0.1306	191	23.04	1263	0.1512
1998	230	Mule deer	ODHE1	39	176	0.2216	191	20.42	1263	0.1512
1998	322	Mule deer	ODHE1	85	100	0.8500	191	44.50	1263	0.1512
1998	323	Mule deer	ODHE1	17	134	0.1269	191	8.90	1263	0.1512
1998	110	White-tailed deer	ODVI1	2	337	0.0059	2	100.00	1263	0.0016
1997	110	Mule deer	ODHE1	29	411	0.0706	177	16.38	1580	0.1120
1997	230	Mule deer	ODHE1	39	208	0.1875	177	22.03	1580	0.1120
1997	322	Mule deer	ODHE1	72	79	0.9114	177	40.68	1580	0.1120
1997	323	Mule deer	ODHE1	37	204	0.1814	177	20.90	1580	0.1120
1997	323	White-tailed deer	ODVI1	2	204	0.0098	2	100.00	1580	0.0013

Table 3-3. (cont.)

Year	Hab1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	20	Mule deer	ODHE1	6	132	0.0455	112	5.36	1726	0.0649
1996	110	Mule deer	ODHE1	11	304	0.0362	112	9.82	1726	0.0649
1996	130	Mule deer	ODHE1	10	1	10.0000	112	8.93	1726	0.0649
1996	230	Mule deer	ODHE1	31	174	0.1782	112	27.68	1726	0.0649
1996	322	Mule deer	ODHE1	33	225	0.1467	112	29.46	1726	0.0649
1996	323	Mule deer	ODHE1	21	145	0.1448	112	18.75	1726	0.0649
1996	322	White-tailed deer	ODVI1	1	225	0.0044	1	100.00	1726	0.0006
1995	10	Mule deer	ODHE1	21	75	0.2800	171	12.28	1786	0.0957
1995	20	Mule deer	ODHE1	11	90	0.1222	171	6.43	1786	0.0957
1995	110	Mule deer	ODHE1	1	381	0.0026	171	0.58	1786	0.0957
1995	212	Mule deer	ODHE1	1	167	0.0060	171	0.58	1786	0.0957
1995	230	Mule deer	ODHE1	15	175	0.0857	171	8.77	1786	0.0957
1995	322	Mule deer	ODHE1	92	284	0.3239	171	53.80	1786	0.0957
1995	324	Mule deer	ODHE1	30	31	0.9677	171	17.54	1786	0.0957

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-4. Big game relative abundance in summer (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	20	Mule deer	ODHE1	5	104	0.0481	106	4.72	1296	0.0818
2000	30	Mule deer	ODHE1	6	112	0.0536	106	5.66	1296	0.0818
2000	93	Mule deer	ODHE1	1	35	0.0286	106	0.94	1296	0.0818
2000	110	Mule deer	ODHE1	41	338	0.1213	106	38.68	1296	0.0818
2000	211	Mule deer	ODHE1	1	30	0.0333	106	0.94	1296	0.0818
2000	212	Mule deer	ODHE1	8	82	0.0976	106	7.55	1296	0.0818
2000	230	Mule deer	ODHE1	27	199	0.1357	106	25.47	1296	0.0818
2000	322	Mule deer	ODHE1	16	145	0.1103	106	15.09	1296	0.0818
2000	323	Mule deer	ODHE1	1	121	0.0083	106	0.94	1296	0.0818
2000	110	White-tailed deer	ODVI1	1	338	0.0030	3	33.33	1296	0.0023
2000	212	White-tailed deer	ODVI1	2	82	0.0244	3	66.67	1296	0.0023
2000	230	Elk (Wapiti)	CEEL1	1	199	0.0050	1	100.00	1296	0.0008
1999	10	Mule deer	ODHE1	6	59	0.1017	106	5.66	1547	0.0685
1999	20	Mule deer	ODHE1	14	98	0.1429	106	13.21	1547	0.0685
1999	110	Mule deer	ODHE1	35	411	0.0852	106	33.02	1547	0.0685
1999	212	Mule deer	ODHE1	10	124	0.0806	106	9.43	1547	0.0685
1999	230	Mule deer	ODHE1	25	202	0.1238	106	23.58	1547	0.0685
1999	322	Mule deer	ODHE1	5	159	0.0314	106	4.72	1547	0.0685
1999	323	Mule deer	ODHE1	10	159	0.0629	106	9.43	1547	0.0685
1999	324	Mule deer	ODHE1	1	23	0.0435	106	0.94	1547	0.0685
1999	30	White-tailed deer	ODVI1	4	109	0.0367	8	50.00	1547	0.0052
1999	212	White-tailed deer	ODVI1	2	124	0.0161	8	25.00	1547	0.0052
1999	230	White-tailed deer	ODVI1	2	202	0.0099	8	25.00	1547	0.0052
1998	10	Mule deer	ODHE1	1	49	0.0204	76	1.32	1339	0.0568
1998	20	Mule deer	ODHE1	5	74	0.0676	76	6.58	1339	0.0568
1998	30	Mule deer	ODHE1	6	111	0.0541	76	7.89	1339	0.0568
1998	93	Mule deer	ODHE1	2	28	0.0714	76	2.63	1339	0.0568
1998	110	Mule deer	ODHE1	18	352	0.0511	76	23.68	1339	0.0568
1998	211	Mule deer	ODHE1	2	50	0.0400	76	2.63	1339	0.0568
1998	212	Mule deer	ODHE1	10	79	0.1266	76	13.16	1339	0.0568
1998	230	Mule deer	ODHE1	24	192	0.1250	76	31.58	1339	0.0568
1998	322	Mule deer	ODHE1	3	67	0.0448	76	3.95	1339	0.0568

Table 3-4. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	323	Mule deer	ODHE1	4	170	0.0235	76	5.26	1339	0.0568
1998	324	Mule deer	ODHE1	1	28	0.0357	76	1.32	1339	0.0568
1998	30	White-tailed deer	ODVI1	3	111	0.0270	4	75.00	1339	0.0030
1998	211	White-tailed deer	ODVI1	1	50	0.0200	4	25.00	1339	0.0030
1997	10	Mule deer	ODHE1	1	75	0.0133	96	1.04	1361	0.0705
1997	20	Mule deer	ODHE1	2	80	0.0250	96	2.08	1361	0.0705
1997	30	Mule deer	ODHE1	7	129	0.0543	96	7.29	1361	0.0705
1997	110	Mule deer	ODHE1	19	327	0.0581	96	19.79	1361	0.0705
1997	211	Mule deer	ODHE1	7	62	0.1129	96	7.29	1361	0.0705
1997	212	Mule deer	ODHE1	6	92	0.0652	96	6.25	1361	0.0705
1997	230	Mule deer	ODHE1	36	212	0.1698	96	37.50	1361	0.0705
1997	322	Mule deer	ODHE1	13	77	0.1688	96	13.54	1361	0.0705
1997	323	Mule deer	ODHE1	3	126	0.0238	96	3.13	1361	0.0705
1997	324	Mule deer	ODHE1	2	34	0.0588	96	2.08	1361	0.0705
1997	212	White-tailed deer	ODVI1	3	92	0.0326	3	100.00	1361	0.0022
1996	10	Mule deer	ODHE1	3	79	0.0380	110	2.73	1609	0.0684
1996	20	Mule deer	ODHE1	5	60	0.0833	110	4.55	1609	0.0684
1996	30	Mule deer	ODHE1	6	132	0.0455	110	5.45	1609	0.0684
1996	93	Mule deer	ODHE1	2	32	0.0625	110	1.82	1609	0.0684
1996	110	Mule deer	ODHE1	16	451	0.0355	110	14.55	1609	0.0684
1996	212	Mule deer	ODHE1	13	118	0.1102	110	11.82	1609	0.0684
1996	220	Mule deer	ODHE1	2	4	0.5000	110	1.82	1609	0.0684
1996	230	Mule deer	ODHE1	41	186	0.2204	110	37.27	1609	0.0684
1996	322	Mule deer	ODHE1	17	119	0.1429	110	15.45	1609	0.0684
1996	323	Mule deer	ODHE1	3	210	0.0143	110	2.73	1609	0.0684
1996	324	Mule deer	ODHE1	2	35	0.0571	110	1.82	1609	0.0684
1996	30	White-tailed deer	ODVI1	2	132	0.0152	5	40.00	1609	0.0031
1996	212	White-tailed deer	ODVI1	1	118	0.0085	5	20.00	1609	0.0031
1996	230	White-tailed deer	ODVI1	1	186	0.0054	5	20.00	1609	0.0031
1996	322	White-tailed deer	ODVI1	1	119	0.0084	5	20.00	1609	0.0031
1996	230	Mule X White-tailed deer	HEXVI	1	186	0.0054	1	100.00	1609	0.0006

Table 3-4. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	10	Mule deer	ODHE1	7	177	0.0395	119	5.88	2269	0.0524
1995	20	Mule deer	ODHE1	13	102	0.1275	119	10.92	2269	0.0524
1995	30	Mule deer	ODHE1	2	109	0.0183	119	1.68	2269	0.0524
1995	110	Mule deer	ODHE1	29	312	0.0929	119	24.37	2269	0.0524
1995	212	Mule deer	ODHE1	12	753	0.0159	119	10.08	2269	0.0524
1995	230	Mule deer	ODHE1	34	288	0.1181	119	28.57	2269	0.0524
1995	322	Mule deer	ODHE1	22	299	0.0736	119	18.49	2269	0.0524
1995	230	White-tailed deer	ODV11	1	288	0.0035	1	100.00	2269	0.0004

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-5. Big game relative abundance in fall (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	10	Mule deer	ODHE1	1	16	0.0625	145	0.69	1132	0.1281
2000	20	Mule deer	ODHE1	9	95	0.0947	145	6.21	1132	0.1281
2000	30	Mule deer	ODHE1	14	87	0.1609	145	9.66	1132	0.1281
2000	110	Mule deer	ODHE1	17	269	0.0632	145	11.72	1132	0.1281
2000	211	Mule deer	ODHE1	7	28	0.2500	145	4.83	1132	0.1281
2000	212	Mule deer	ODHE1	24	86	0.2791	145	16.55	1132	0.1281
2000	230	Mule deer	ODHE1	40	169	0.2367	145	27.59	1132	0.1281
2000	322	Mule deer	ODHE1	33	128	0.2578	145	22.76	1132	0.1281
2000	30	White-tailed deer	ODVI1	7	87	0.0805	12	58.33	1132	0.0106
2000	110	White-tailed deer	ODVI1	1	269	0.0037	12	8.33	1132	0.0106
2000	212	White-tailed deer	ODVI1	4	86	0.0465	12	33.33	1132	0.0106
1999	10	Mule deer	ODHE1	4	49	0.0816	132	3.03	1356	0.0973
1999	20	Mule deer	ODHE1	24	87	0.2759	132	18.18	1356	0.0973
1999	30	Mule deer	ODHE1	8	125	0.0640	132	6.06	1356	0.0973
1999	110	Mule deer	ODHE1	26	323	0.0805	132	19.70	1356	0.0973
1999	212	Mule deer	ODHE1	10	164	0.0610	132	7.58	1356	0.0973
1999	230	Mule deer	ODHE1	26	186	0.1398	132	19.70	1356	0.0973
1999	322	Mule deer	ODHE1	23	133	0.1729	132	17.42	1356	0.0973
1999	323	Mule deer	ODHE1	11	129	0.0853	132	8.33	1356	0.0973
1999	110	White-tailed deer	ODVI1	5	323	0.0155	7	71.43	1356	0.0052
1999	322	White-tailed deer	ODVI1	2	133	0.0150	7	28.57	1356	0.0052
1998	10	Mule deer	ODHE1	12	50	0.2400	167	7.19	1210	0.1380
1998	20	Mule deer	ODHE1	7	88	0.0795	167	4.19	1210	0.1380
1998	30	Mule deer	ODHE1	1	90	0.0111	167	0.60	1210	0.1380
1998	110	Mule deer	ODHE1	62	310	0.2000	167	37.13	1210	0.1380
1998	211	Mule deer	ODHE1	1	35	0.0286	167	0.60	1210	0.1380
1998	212	Mule deer	ODHE1	17	93	0.1828	167	10.18	1210	0.1380
1998	230	Mule deer	ODHE1	31	164	0.1890	167	18.56	1210	0.1380
1998	322	Mule deer	ODHE1	24	90	0.2667	167	14.37	1210	0.1380
1998	323	Mule deer	ODHE1	3	138	0.0217	167	1.80	1210	0.1380
1998	324	Mule deer	ODHE1	9	29	0.3103	167	5.39	1210	0.1380
1998	110	White-tailed deer	ODVI1	2	310	0.0065	5	40.00	1210	0.0041
1998	230	White-tailed deer	ODVI1	3	164	0.0183	5	60.00	1210	0.0041
1998	30	Elk (Wapiti)	CEEL1	1	90	0.0111	1	100.00	1210	0.0008

Table 3-5. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	10	Mule deer	ODHE1	4	63	0.0635	123	3.25	1221	0.1007
1997	20	Mule deer	ODHE1	17	95	0.1789	123	13.82	1221	0.1007
1997	110	Mule deer	ODHE1	15	313	0.0479	123	12.20	1221	0.1007
1997	211	Mule deer	ODHE1	3	55	0.0545	123	2.44	1221	0.1007
1997	212	Mule deer	ODHE1	17	86	0.1977	123	13.82	1221	0.1007
1997	230	Mule deer	ODHE1	45	182	0.2473	123	36.59	1221	0.1007
1997	322	Mule deer	ODHE1	22	62	0.3548	123	17.89	1221	0.1007
1997	20	White-tailed deer	ODVI1	1	95	0.0105	2	50.00	1221	0.0016
1997	230	White-tailed deer	ODVI1	1	182	0.0055	2	50.00	1221	0.0016
1997	230	Mule X White-tailed deer	HEXVI	1	182	0.0055	1	100.00	1221	0.0008
1996	10	Mule deer	ODHE1	2	64	0.0313	228	0.88	1418	0.1608
1996	20	Mule deer	ODHE1	7	109	0.0642	228	3.07	1418	0.1608
1996	110	Mule deer	ODHE1	3	300	0.0100	228	1.32	1418	0.1608
1996	211	Mule deer	ODHE1	5	112	0.0446	228	2.19	1418	0.1608
1996	212	Mule deer	ODHE1	15	101	0.1485	228	6.58	1418	0.1608
1996	220	Mule deer	ODHE1	1	1	1.0000	228	0.44	1418	0.1608
1996	230	Mule deer	ODHE1	81	196	0.4133	228	35.53	1418	0.1608
1996	322	Mule deer	ODHE1	68	105	0.6476	228	29.82	1418	0.1608
1996	323	Mule deer	ODHE1	34	148	0.2297	228	14.91	1418	0.1608
1996	324	Mule deer	ODHE1	12	41	0.2927	228	5.26	1418	0.1608
1996	211	White-tailed deer	ODVI1	3	112	0.0268	3	100.00	1418	0.0021
1996	30	Elk (Wapiti)	CEEL1	1	95	0.0105	1	100.00	1418	0.0007
1996	230	Mule X White-tailed deer	HEXVI	1	196	0.0051	1	100.00	1418	0.0007
1995	20	Mule deer	ODHE1	1	125	0.0080	112	0.892857	1837	0.0610
1995	30	Mule deer	ODHE1	5	84	0.0595	112	4.464286	1837	0.0610
1995	110	Mule deer	ODHE1	28	373	0.0751	112	25	1837	0.0610
1995	210	Mule deer	ODHE1	1	11	0.0909	112	0.892857	1837	0.0610
1995	211	Mule deer	ODHE1	1	102	0.0098	112	0.892857	1837	0.0610
1995	212	Mule deer	ODHE1	14	200	0.0700	112	12.5	1837	0.0610
1995	230	Mule deer	ODHE1	22	220	0.1000	112	19.64286	1837	0.0610
1995	322	Mule deer	ODHE1	40	327	0.1223	112	35.71429	1837	0.0610
1995	110	White-tailed deer	ODVI1	5	373	0.0134	5	100	1837	0.0027
1995	322	Mule X White-tailed deer	HEXVI	1	327	0.0031	1	100	1837	0.0005

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-6. Big game relative abundance in winter (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	10	Mule deer	ODHE1	9	20	0.4500	253	3.56	1081	0.2340
2000	20	Mule deer	ODHE1	43	75	0.5733	253	17.00	1081	0.2340
2000	30	Mule deer	ODHE1	10	101	0.0990	253	3.95	1081	0.2340
2000	110	Mule deer	ODHE1	15	311	0.0482	253	5.93	1081	0.2340
2000	212	Mule deer	ODHE1	36	68	0.5294	253	14.23	1081	0.2340
2000	230	Mule deer	ODHE1	41	134	0.3060	253	16.21	1081	0.2340
2000	322	Mule deer	ODHE1	82	157	0.5223	253	32.41	1081	0.2340
2000	323	Mule deer	ODHE1	17	126	0.1349	253	6.72	1081	0.2340
2000	110	White-tailed deer	ODVI1	19	311	0.0611	35	54.29	1081	0.0324
2000	322	White-tailed deer	ODVI1	16	157	0.1019	35	45.71	1081	0.0324
1999	20	Mule deer	ODHE1	14	93	0.1505	261	5.36	1053	0.2479
1999	110	Mule deer	ODHE1	30	263	0.1141	261	11.49	1053	0.2479
1999	212	Mule deer	ODHE1	26	63	0.4127	261	9.96	1053	0.2479
1999	230	Mule deer	ODHE1	16	136	0.1176	261	6.13	1053	0.2479
1999	322	Mule deer	ODHE1	142	152	0.9342	261	54.41	1053	0.2479
1999	323	Mule deer	ODHE1	24	127	0.1890	261	9.20	1053	0.2479
1999	324	Mule deer	ODHE1	9	16	0.5625	261	3.45	1053	0.2479
1998	20	Mule deer	ODHE1	4	126	0.0317	137	2.92	1092	0.1255
1998	110	Mule deer	ODHE1	8	300	0.0267	137	5.84	1092	0.1255
1998	212	Mule deer	ODHE1	1	94	0.0106	137	0.73	1092	0.1255
1998	230	Mule deer	ODHE1	34	137	0.2482	137	24.82	1092	0.1255
1998	322	Mule deer	ODHE1	74	93	0.7957	137	54.01	1092	0.1255
1998	323	Mule deer	ODHE1	9	114	0.0789	137	6.57	1092	0.1255
1998	324	Mule deer	ODHE1	7	59	0.1186	137	5.11	1092	0.1255
1998	230	Elk (Wapiti)	CEEL1	1	137	0.0073	1	100.00	1092	0.0009
1997	10	Mule deer	ODHE1	1	33	0.0303	175	0.57	1112	0.1574
1997	110	Mule deer	ODHE1	5	310	0.0161	175	2.86	1112	0.1574
1997	230	Mule deer	ODHE1	18	156	0.1154	175	10.29	1112	0.1574
1997	322	Mule deer	ODHE1	140	86	1.6279	175	80.00	1112	0.1574
1997	323	Mule deer	ODHE1	1	149	0.0067	175	0.57	1112	0.1574
1997	324	Mule deer	ODHE1	10	16	0.6250	175	5.71	1112	0.1574
1997	322	White-tailed deer	ODVI1	1	86	0.0116	1	100.00	1112	0.0009

Table 3-6. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	30	Mule deer	ODHE1	5	81	0.0617	260	1.92	1243	0.2092
1996	110	Mule deer	ODHE1	21	275	0.0764	260	8.08	1243	0.2092
1996	212	Mule deer	ODHE1	32	148	0.2162	260	12.31	1243	0.2092
1996	230	Mule deer	ODHE1	20	144	0.1389	260	7.69	1243	0.2092
1996	322	Mule deer	ODHE1	112	111	1.0090	260	43.08	1243	0.2092
1996	323	Mule deer	ODHE1	50	244	0.2049	260	19.23	1243	0.2092
1996	324	Mule deer	ODHE1	20	21	0.9524	260	7.69	1243	0.2092
1995	10	Mule deer	ODHE1	1	72	0.0139	153	0.653595	1496	0.1023
1995	20	Mule deer	ODHE1	5	133	0.0376	153	3.267974	1496	0.1023
1995	110	Mule deer	ODHE1	26	333	0.0781	153	16.99346	1496	0.1023
1995	211	Mule deer	ODHE1	1	71	0.0141	153	0.653595	1496	0.1023
1995	212	Mule deer	ODHE1	10	162	0.0617	153	6.535948	1496	0.1023
1995	230	Mule deer	ODHE1	15	156	0.0962	153	9.803922	1496	0.1023
1995	322	Mule deer	ODHE1	94	209	0.4498	153	61.43791	1496	0.1023
1995	323	Mule deer	ODHE1	1	95	0.0105	153	0.653595	1496	0.1023
1995	110	White-tailed deer	ODVI1	2	333	0.0060	2	100	1496	0.0013

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-7. Lagomorph and large rodent relative abundance (1995-2000)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Spring	54	Muskrat	ONZI1	3	107	0.0280	3	100.00	1273	0.0024
1999	Spring	420	Desert cottontail	SYAU1	4	6	0.6667	8	50.00	1302	0.0061
1999	Spring	530	Desert cottontail	SYAU1	2	1	2.0000	8	25.00	1302	0.0061
1999	Spring	540	Desert cottontail	SYAU1	2	2	1.0000	8	25.00	1302	0.0061
1999	Spring	54	Muskrat	ONZI1	2	112	0.0179	2	100.00	1302	0.0015
1998	Spring	530	Desert cottontail	SYAU1	3	5	0.6000	3	100.00	1263	0.0024
1998	Spring	54	Muskrat	ONZI1	1	113	0.0088	1	100.00	1263	0.0008
1997	Spring	410	Desert cottontail	SYAU1	2	2	1.0000	5	40.00	1580	0.0032
1997	Spring	530	Desert cottontail	SYAU1	2	1	2.0000	5	40.00	1580	0.0032
1997	Spring	540	Desert cottontail	SYAU1	1	6	0.1667	5	20.00	1580	0.0032
1997	Spring	54	Muskrat	ONZI1	1	150	0.0067	1	100.00	1580	0.0006
1996	Spring	54	Muskrat	ONZI1	6	181	0.0331	6	100.00	1726	0.0035
1996	Spring	530	Desert cottontail	SYAU1	3	27	0.1111	4	75.00	1726	0.0023
1996	Spring	540	Desert cottontail	SYAU1	1	12	0.0833	4	25.00	1726	0.0023
1995	Spring	30	Desert cottontail	SYAU1	4	163	0.0245	14	28.57	1786	0.0078
1995	Spring	420	Desert cottontail	SYAU1	4	2	2.0000	14	28.57	1786	0.0078
1995	Spring	530	Desert cottontail	SYAU1	1	21	0.0476	14	7.14	1786	0.0078
1995	Spring	540	Desert cottontail	SYAU1	5	24	0.2083	14	35.71	1786	0.0078
2000	Summer	54	Muskrat	ONZI1	3	97	0.0309	3	100.00	1296	0.0023
2000	Summer	540	Desert cottontail	SYAU1	3	7	0.4286	3	100.00	1296	0.0023
2000	Summer	323	Thirteen-lined Ground Squirrel	SPTR1	1	121	0.0083	1	100.00	1296	0.0008
1999	Summer	420	Desert cottontail	SYAU1	1	3	0.3333	3	33.33	1547	0.0019
1999	Summer	540	Desert cottontail	SYAU1	2	5	0.4000	3	66.67	1547	0.0019
1998	Summer	54	Muskrat	ONZI1	13	131	0.0992	13	100.00	1339	0.0097
1998	Summer	324	Desert cottontail	SYAU1	1	28	0.0357	2	50.00	1339	0.0015
1998	Summer	420	Desert cottontail	SYAU1	1	6	0.1667	2	50.00	1339	0.0015

Table 3-7. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	Summer	110	Desert cottontail	SYAU1	3	327	0.0092	13	23.08	1361	0.0096
1997	Summer	322	Desert cottontail	SYAU1	3	77	0.0390	13	23.08	1361	0.0096
1997	Summer	410	Desert cottontail	SYAU1	3	1	3.0000	13	23.08	1361	0.0096
1997	Summer	420	Desert cottontail	SYAU1	1	5	0.2000	13	7.69	1361	0.0096
1997	Summer	540	Desert cottontail	SYAU1	3	8	0.3750	13	23.08	1361	0.0096
1997	Summer	54	Muskrat	ONZI1	1	102	0.0098	1	100.00	1361	0.0007
1996	Summer	212	Desert cottontail	SYAU1	1	118	0.0085	17	5.88	1609	0.0106
1996	Summer	322	Desert cottontail	SYAU1	2	119	0.0168	17	11.76	1609	0.0106
1996	Summer	324	Desert cottontail	SYAU1	2	35	0.0571	17	11.76	1609	0.0106
1996	Summer	410	Desert cottontail	SYAU1	3	5	0.6000	17	17.65	1609	0.0106
1996	Summer	420	Desert cottontail	SYAU1	5	3	1.6667	17	29.41	1609	0.0106
1996	Summer	530	Desert cottontail	SYAU1	1	3	0.3333	17	5.88	1609	0.0106
1996	Summer	540	Desert cottontail	SYAU1	3	11	0.2727	17	17.65	1609	0.0106
1996	Summer	54	Muskrat	ONZI1	5	85	0.0588	5	100.00	1609	0.0031
1995	Summer	324	Desert cottontail	SYAU1	1	27	0.0370	12	8.33	2269	0.0053
1995	Summer	420	Desert cottontail	SYAU1	2	2	1.0000	12	16.67	2269	0.0053
1995	Summer	520	Desert cottontail	SYAU1	2	1	2.0000	12	16.67	2269	0.0053
1995	Summer	530	Desert cottontail	SYAU1	5	12	0.4167	12	41.67	2269	0.0053
1995	Summer	550	Desert cottontail	SYAU1	2	1	2.0000	12	16.67	2269	0.0053
1995	Summer	54	Muskrat	ONZI1	2	77	0.0260	2	100.00	2269	0.0009
2000	Fall	54	Muskrat	ONZI1	2	113	0.0177	2	100.00	1132	0.0018
1999	Fall	54	Muskrat	ONZI1	4	113	0.0354	4	100.00	1356	0.0029
1999	Fall	322	Desert cottontail	SYAU1	1	133	0.0075	2	50.00	1356	0.0015
1999	Fall	540	Desert cottontail	SYAU1	1	11	0.0909	2	50.00	1356	0.0015
1999	Fall	110	Eastern fox squirrel	SCNI1	1	323	0.0031	1	100.00	1356	0.0007
1998	Fall	No data	None observed								

Table 3-7. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	Fall	322	Desert cottontail	SYAU1	2	62	0.0323	6	33.33	1221	0.0049
1997	Fall	324	Desert cottontail	SYAU1	1	16	0.0625	6	16.67	1221	0.0049
1997	Fall	530	Desert cottontail	SYAU1	1	2	0.5000	6	16.67	1221	0.0049
1997	Fall	540	Desert cottontail	SYAU1	2	21	0.0952	6	33.33	1221	0.0049
1997	Fall	54	Muskrat	ONZI1	3	82	0.0366	3	100.00	1221	0.0025
1997	Fall	323	unidentified jackrabbit	LEP1	1	161	0.0062	1	100.00	1221	0.0008
1996	Fall	323	Desert cottontail	SYAU1	1	148	0.0068	4	25.00	1418	0.0028
1996	Fall	420	Desert cottontail	SYAU1	1	13	0.0769	4	25.00	1418	0.0028
1996	Fall	530	Desert cottontail	SYAU1	2	3	0.6667	4	50.00	1418	0.0028
1996	Fall	54	Muskrat	ONZI1	1	103	0.0097	1	100.00	1418	0.0007
1996	Fall	110	Eastern fox squirrel	SCNI1	1	300	0.0033	1	100.00	1418	0.0007
1995	Fall	110	Desert cottontail	SYAU1	1	373	0.0027	22	4.545455	1837	0.0120
1995	Fall	324	Desert cottontail	SYAU1	1	31	0.0323	22	4.545455	1837	0.0120
1995	Fall	420	Desert cottontail	SYAU1	12	12	1.0000	22	54.54545	1837	0.0120
1995	Fall	530	Desert cottontail	SYAU1	7	131	0.0534	22	31.81818	1837	0.0120
1995	Fall	540	Desert cottontail	SYAU1	1	2	0.5000	22	4.545455	1837	0.0120
1995	Fall	54	Muskrat	ONZI1	2	134	0.0149	2	100	1837	0.0011
2000	Winter	54	Muskrat	ONZI1	6	50	0.1200	6	100.00	1081	0.0056
2000	Winter	540	Desert cottontail	SYAU1	1	9	0.1111	1	100.00	1081	0.0009
1999	Winter	30	unidentified jackrabbit	LEP1	1	73	0.0137	1	100.00	1053	0.0009
1999	Winter	54	Muskrat	ONZI1	1	61	0.0164	1	100.00	1053	0.0009
1999	Winter	110	Common porcupine	ERDO1	1	263	0.0038	1	100.00	1053	0.0009
1999	Winter	540	Desert cottontail	SYAU1	1	5	0.2000	1	100.00	1053	0.0009
1998	Winter	230	Common porcupine	ERDO1	1	137	0.0073	1	100.00	1092	0.0009
1998	Winter	530	Desert cottontail	SYAU1	1	1	1.0000	1	100.00	1092	0.0009
1997	Winter	420	Desert cottontail	SYAU1	2	3	0.6667	2	100.00	1112	0.0018

Table 3-7. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	Winter	212	Desert cottontail	SYAU1	1	148	0.0068	5	20.00	1243	0.0040
1996	Winter	322	Desert cottontail	SYAU1	1	111	0.0090	5	20.00	1243	0.0040
1996	Winter	323	Desert cottontail	SYAU1	1	244	0.0041	5	20.00	1243	0.0040
1996	Winter	324	Desert cottontail	SYAU1	1	21	0.0476	5	20.00	1243	0.0040
1996	Winter	410	Desert cottontail	SYAU1	1	9	0.1111	5	20.00	1243	0.0040
1996	Winter	420	unidentified jackrabbit	LEP1	1	1	1.0000	1	100.00	1243	0.0008
1995	Winter	110	Desert cottontail	SYAU1	1	333	0.0030	11	9.090909	1496	0.0074
1995	Winter	420	Desert cottontail	SYAU1	8	5	1.6000	11	72.72727	1496	0.0074
1995	Winter	520	Desert cottontail	SYAU1	2	6	0.3333	11	18.18182	1496	0.0074
1995	Winter	30	Muskrat	ONZI1	1	124	0.0081	1	100	1496	0.0007
1995	Winter	323	unidentified jackrabbit	LEP1	1	95	0.0105	1	100	1496	0.0007

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-8. Seasonal lagomorph and large rodent area use (1997-2000).

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	2	N	Black-tailed prairie dog	CYLU1	6
Spring	2	O	Black-tailed prairie dog	CYLU1	10
Spring	7	N	Desert cottontail	SYAU1	1
Spring	12	Q	Desert cottontail	SYAU1	1
Spring	3	R	Muskrat	ONZI1	1
Spring	2	N	White-tailed jackrabbit	LETO1	1
Summer	2	N	Black-tailed prairie dog	CYLU1	39
Summer	2	O	Black-tailed prairie dog	CYLU1	6
Summer	2	O	Black-tailed prairie dog	CYLU1	23
Summer	7	N	Desert cottontail	SYAU1	1
Summer	7	P	Desert cottontail	SYAU1	1
Summer	8	L	Desert cottontail	SYAU1	7
Summer	8	N	Desert cottontail	SYAU1	2
Summer	10	H	Desert cottontail	SYAU1	1
Summer	10	Q	Desert cottontail	SYAU1	4
Summer	11	J	Desert cottontail	SYAU1	1
Summer	11	N	Desert cottontail	SYAU1	5
Summer	12	J	Desert cottontail	SYAU1	1
Summer	13	K	Desert cottontail	SYAU1	1
Summer	13	N	Desert cottontail	SYAU1	1
Summer	14	P	Desert cottontail	SYAU1	3
Summer	15	N	Desert cottontail	SYAU1	2
Summer	15	P	Desert cottontail	SYAU1	1
Summer	7	N	Muskrat	ONZI1	1
Summer	10	O	Muskrat	ONZI1	3
Fall	2	N	Black-tailed prairie dog	CYLU1	3
Fall	2	O	Black-tailed prairie dog	CYLU1	53
Fall	8	L	Desert cottontail	SYAU1	4
Fall	12	Q	Desert cottontail	SYAU1	1
Fall	13	L	Desert cottontail	SYAU1	1
Fall	13	Q	Desert cottontail	SYAU1	3
Fall	14	L	Desert cottontail	SYAU1	1
Fall	14	N	Desert cottontail	SYAU1	1
Fall	10	O	Muskrat	ONZI1	4
Winter	2	N	Black-tailed prairie dog	CYLU1	22
Winter	2	O	Black-tailed prairie dog	CYLU1	12
Winter	8	T	Black-tailed prairie dog	CYLU1	4
Winter	17	P	Black-tailed prairie dog	CYLU1	2
Winter	13	G	Common porcupine	ERDO1	1
Winter	9	N	Desert cottontail	SYAU1	1
Winter	13	L	Desert cottontail	SYAU1	1
Winter	8	F	unidentified jackrabbit	LEP1	2
Winter	13	G	unidentified jackrabbit	LEP1	1

Note: RF Grid = grid coordinate; SpecCode = species code

Table 3-9. Carnivore relative abundance (1995-2000)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Spring	110	Coyote	CALA1	3	341	0.0088	6	50.00	1273	0.0047
2000	Spring	230	Coyote	CALA1	1	184	0.0054	6	16.67	1273	0.0047
2000	Spring	322	Coyote	CALA1	2	146	0.0137	6	33.33	1273	0.0047
1999	Spring	20	Coyote	CALA1	2	104	0.0192	15	13.33	1302	0.0115
1999	Spring	30	Coyote	CALA1	1	107	0.0093	15	6.67	1302	0.0115
1999	Spring	110	Coyote	CALA1	1	301	0.0033	15	6.67	1302	0.0115
1999	Spring	322	Coyote	CALA1	10	181	0.0552	15	66.67	1302	0.0115
1999	Spring	323	Coyote	CALA1	1	139	0.0072	15	6.67	1302	0.0115
1998	Spring	230	Coyote	CALA1	1	176	0.0057	4	25.00	1263	0.0032
1998	Spring	322	Coyote	CALA1	3	100	0.0300	4	75.00	1263	0.0032
1998	Spring	322	Mountain lion	FECO1	1	100	0.0100	1	100.00	1263	0.0008
1997	Spring	20	Coyote	CALA1	1	172	0.0058	8	12.50	1580	0.0051
1997	Spring	30	Coyote	CALA1	1	99	0.0101	8	12.50	1580	0.0051
1997	Spring	212	Coyote	CALA1	1	138	0.0072	8	12.50	1580	0.0051
1997	Spring	230	Coyote	CALA1	1	208	0.0048	8	12.50	1580	0.0051
1997	Spring	323	Coyote	CALA1	4	204	0.0196	8	50.00	1580	0.0051
1996	Spring	20	Coyote	CALA1	2	132	0.0152	3	66.67	1726	0.0017
1996	Spring	230	Coyote	CALA1	1	174	0.0057	3	33.33	1726	0.0017
1995	Spring	10	Coyote	CALA1	2	75	0.0267	6	33.33	1786	0.0034
1995	Spring	30	Coyote	CALA1	1	163	0.0061	6	16.67	1786	0.0034
1995	Spring	322	Coyote	CALA1	3	284	0.0106	6	50.00	1786	0.0034
2000	Summer	20	Coyote	CALA1	2	104	0.0192	15	13.33	1296	0.0116
2000	Summer	230	Coyote	CALA1	10	199	0.0503	15	66.67	1296	0.0116
2000	Summer	322	Coyote	CALA1	1	145	0.0069	15	6.67	1296	0.0116
2000	Summer	323	Coyote	CALA1	2	121	0.0165	15	13.33	1296	0.0116
1999	Summer	10	Coyote	CALA1	4	59	0.0678	11	36.36	1547	0.0071
1999	Summer	30	Coyote	CALA1	3	109	0.0275	11	27.27	1547	0.0071
1999	Summer	110	Coyote	CALA1	1	411	0.0024	11	9.09	1547	0.0071
1999	Summer	230	Coyote	CALA1	3	202	0.0149	11	27.27	1547	0.0071

Table 3-9. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	Summer	20	Coyote	CALA1	2	74	0.0270	7	28.57	1339	0.0052
1998	Summer	110	Coyote	CALA1	1	352	0.0028	7	14.29	1339	0.0052
1998	Summer	230	Coyote	CALA1	3	192	0.0156	7	42.86	1339	0.0052
1998	Summer	322	Coyote	CALA1	1	67	0.0149	7	14.29	1339	0.0052
1997	Summer	230	Coyote	CALA1	1	212	0.0047	2	50.00	1361	0.0015
1997	Summer	322	Coyote	CALA1	1	77	0.0130	2	50.00	1361	0.0015
1997	Summer	110	American black bear	URAM1	1	327	0.0031	1	100.00	1361	0.0007
1996	Summer	93	Coyote	CALA1	1	32	0.0313	18	5.56	1609	0.0112
1996	Summer	110	Coyote	CALA1	1	451	0.0022	18	5.56	1609	0.0112
1996	Summer	212	Coyote	CALA1	5	118	0.0424	18	27.78	1609	0.0112
1996	Summer	220	Coyote	CALA1	2	4	0.5000	18	11.11	1609	0.0112
1996	Summer	230	Coyote	CALA1	2	186	0.0108	18	11.11	1609	0.0112
1996	Summer	322	Coyote	CALA1	5	119	0.0420	18	27.78	1609	0.0112
1996	Summer	323	Coyote	CALA1	2	210	0.0095	18	11.11	1609	0.0112
1996	Summer	93	Raccoon	PRLO1	3	32	0.0938	3	100.00	1609	0.0019
1996	Summer	93	Common gray fox	URCI1	1	32	0.0313	1	100.00	1609	0.0006
1996	Summer	110	Striped skunk	MEME1	1	451	0.0022	1	100.00	1609	0.0006
1995	Summer	20	Raccoon	PRLO1	1	102	0.0098	1	100.00	2269	0.0004
2000	Fall	20	Coyote	CALA1	4	95	0.0421	12	33.33	1132	0.0106
2000	Fall	30	Coyote	CALA1	2	87	0.0230	12	16.67	1132	0.0106
2000	Fall	110	Coyote	CALA1	2	269	0.0074	12	16.67	1132	0.0106
2000	Fall	211	Coyote	CALA1	2	28	0.0714	12	16.67	1132	0.0106
2000	Fall	230	Coyote	CALA1	1	169	0.0059	12	8.33	1132	0.0106
2000	Fall	324	Coyote	CALA1	1	10	0.1000	12	8.33	1132	0.0106
1999	Fall	20	Coyote	CALA1	1	87	0.0115	6	16.67	1356	0.0044
1999	Fall	30	Coyote	CALA1	1	125	0.0080	6	16.67	1356	0.0044
1999	Fall	110	Coyote	CALA1	2	323	0.0062	6	33.33	1356	0.0044
1999	Fall	230	Coyote	CALA1	2	186	0.0108	6	33.33	1356	0.0044

Table 3-9. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	Fall	20	Coyote	CALA1	1	88	0.0114	11	9.09	1210	0.0091
1998	Fall	110	Coyote	CALA1	1	310	0.0032	11	9.09	1210	0.0091
1998	Fall	212	Coyote	CALA1	1	93	0.0108	11	9.09	1210	0.0091
1998	Fall	230	Coyote	CALA1	5	164	0.0305	11	45.45	1210	0.0091
1998	Fall	322	Coyote	CALA1	2	90	0.0222	11	18.18	1210	0.0091
1998	Fall	323	Coyote	CALA1	1	138	0.0072	11	9.09	1210	0.0091
1997	Fall	20	Coyote	CALA1	2	95	0.0211	11	18.18	1221	0.0090
1997	Fall	110	Coyote	CALA1	2	313	0.0064	11	18.18	1221	0.0090
1997	Fall	230	Coyote	CALA1	4	182	0.0220	11	36.36	1221	0.0090
1997	Fall	323	Coyote	CALA1	3	161	0.0186	11	27.27	1221	0.0090
1997	Fall	212	Raccoon	PRLO1	1	86	0.0116	1	100.00	1221	0.0008
1996	Fall	20	Coyote	CALA1	3	109	0.0275	9	33.33	1418	0.0063
1996	Fall	230	Coyote	CALA1	4	196	0.0204	9	44.44	1418	0.0063
1996	Fall	322	Coyote	CALA1	1	105	0.0095	9	11.11	1418	0.0063
1996	Fall	323	Coyote	CALA1	1	148	0.0068	9	11.11	1418	0.0063
1996	Fall	10	American black bear	URAM1	1	64	0.0156	1	100.00	1418	0.0007
1995	Fall	10	Coyote	CALA1	1	44	0.0227	6	16.67	1837	0.0033
1995	Fall	20	Coyote	CALA1	1	125	0.0080	6	16.67	1837	0.0033
1995	Fall	30	Coyote	CALA1	1	84	0.0119	6	16.67	1837	0.0033
1995	Fall	110	Coyote	CALA1	1	373	0.0027	6	16.67	1837	0.0033
1995	Fall	230	Coyote	CALA1	1	220	0.0045	6	16.67	1837	0.0033
1995	Fall	322	Coyote	CALA1	1	327	0.0031	6	16.67	1837	0.0033
2000	Winter	20	Coyote	CALA1	1	75	0.0133	9	11.11	1081	0.0083
2000	Winter	110	Coyote	CALA1	2	311	0.0064	9	22.22	1081	0.0083
2000	Winter	211	Coyote	CALA1	1	26	0.0385	9	11.11	1081	0.0083
2000	Winter	230	Coyote	CALA1	3	134	0.0224	9	33.33	1081	0.0083
2000	Winter	322	Coyote	CALA1	2	157	0.0127	9	22.22	1081	0.0083
2000	Winter	110	Mountain lion	FECO1	1	311	0.0032	1	100.00	1081	0.0009

Table 3-9. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	Winter	20	Coyote	CALA1	3	93	0.0323	16	18.75	1053	0.0152
1999	Winter	30	Coyote	CALA1	5	73	0.0685	16	31.25	1053	0.0152
1999	Winter	211	Coyote	CALA1	2	28	0.0714	16	12.50	1053	0.0152
1999	Winter	230	Coyote	CALA1	3	136	0.0221	16	18.75	1053	0.0152
1999	Winter	322	Coyote	CALA1	3	152	0.0197	16	18.75	1053	0.0152
1998	Winter	30	Coyote	CALA1	1	49	0.0204	10	10.00	1092	0.0092
1998	Winter	110	Coyote	CALA1	2	300	0.0067	10	20.00	1092	0.0092
1998	Winter	230	Coyote	CALA1	7	137	0.0511	10	70.00	1092	0.0092
1998	Winter	212	Mountain lion	FECO1	1	94	0.0106	2	50.00	1092	0.0018
1998	Winter	230	Mountain lion	FECO1	1	137	0.0073	2	50.00	1092	0.0018
1998	Winter	10	Striped skunk	MEME1	1	34	0.0294	1	100.00	1092	0.0009
1997	Winter	20	Coyote	CALA1	8	127	0.0630	19	42.11	1112	0.0171
1997	Winter	54	Coyote	CALA1	1	62	0.0161	19	5.26	1112	0.0171
1997	Winter	110	Coyote	CALA1	2	310	0.0065	19	10.53	1112	0.0171
1997	Winter	211	Coyote	CALA1	1	39	0.0256	19	5.26	1112	0.0171
1997	Winter	230	Coyote	CALA1	5	156	0.0321	19	26.32	1112	0.0171
1997	Winter	323	Coyote	CALA1	2	149	0.0134	19	10.53	1112	0.0171
1996	Winter	20	Coyote	CALA1	2	85	0.0235	30	6.67	1243	0.0241
1996	Winter	30	Coyote	CALA1	6	81	0.0741	30	20.00	1243	0.0241
1996	Winter	110	Coyote	CALA1	8	275	0.0291	30	26.67	1243	0.0241
1996	Winter	230	Coyote	CALA1	5	144	0.0347	30	16.67	1243	0.0241
1996	Winter	322	Coyote	CALA1	5	111	0.0450	30	16.67	1243	0.0241
1996	Winter	323	Coyote	CALA1	4	244	0.0164	30	13.33	1243	0.0241
1995	Winter	10	Coyote	CALA1	3	72	0.0417	14	21.43	1496	0.0094
1995	Winter	54	Coyote	CALA1	1	65	0.0154	14	7.14	1496	0.0094
1995	Winter	110	Coyote	CALA1	3	333	0.0090	14	21.43	1496	0.0094
1995	Winter	212	Coyote	CALA1	2	162	0.0123	14	14.29	1496	0.0094
1995	Winter	322	Coyote	CALA1	4	209	0.0191	14	28.57	1496	0.0094
1995	Winter	323	Coyote	CALA1	1	95	0.0105	14	7.14	1496	0.0094

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-10. Seasonal carnivore area use (1997-2000)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	2	F	Coyote	CALA1	1
Spring	2	J	Coyote	CALA1	1
Spring	2	L	Coyote	CALA1	2
Spring	2	Q	Coyote	CALA1	1
Spring	2	T	Coyote	CALA1	5
Spring	3	K	Coyote	CALA1	1
Spring	3	N	Coyote	CALA1	2
Spring	4	L	Coyote	CALA1	2
Spring	5	F	Coyote	CALA1	1
Spring	5	Q	Coyote	CALA1	1
Spring	7	R	Coyote	CALA1	1
Spring	11	E	Coyote	CALA1	2
Spring	14	L	Coyote	CALA1	1
Spring	15	G	Coyote	CALA1	1
Spring	17	N	Coyote	CALA1	1
Summer	2	T	Coyote	CALA1	1
Summer	3	F	Coyote	CALA1	3
Summer	5	P	Coyote	CALA1	1
Summer	6	Q	Coyote	CALA1	2
Summer	6	R	Coyote	CALA1	1
Summer	7	O	Coyote	CALA1	1
Summer	11	E	Coyote	CALA1	1
Summer	11	O	Coyote	CALA1	1
Summer	11	Q	Coyote	CALA1	1
Summer	12	F	Coyote	CALA1	2
Summer	12	Q	Coyote	CALA1	1
Summer	13	J	Coyote	CALA1	3
Summer	15	F	Coyote	CALA1	1
Summer	16	G	Coyote	CALA1	1
Summer	11	P	Raccoon	PRLO1	6
Fall	2	M	Coyote	CALA1	3
Fall	2	O	Coyote	CALA1	1
Fall	3	R	Coyote	CALA1	4
Fall	3	S	Coyote	CALA1	2
Fall	4	I	Coyote	CALA1	1
Fall	4	M	Coyote	CALA1	1
Fall	5	R	Coyote	CALA1	1
Fall	5	T	Coyote	CALA1	2
Fall	8	E	Coyote	CALA1	1
Fall	9	Q	Coyote	CALA1	1
Fall	11	R	Coyote	CALA1	2
Fall	11	S	Coyote	CALA1	1
Fall	12	N	Coyote	CALA1	2

Table 3-10. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Fall	12	S	Coyote	CALA1	1
Fall	13	E	Coyote	CALA1	1
Fall	13	P	Coyote	CALA1	1
Fall	14	G	Coyote	CALA1	1
Fall	14	H	Coyote	CALA1	2
Fall	14	J	Coyote	CALA1	2
Fall	15	F	Coyote	CALA1	3
Fall	15	G	Coyote	CALA1	1
Fall	15	J	Coyote	CALA1	1
Fall	15	L	Coyote	CALA1	1
Fall	16	M	Coyote	CALA1	1
Winter	2	G	Coyote	CALA1	1
Winter	2	M	Coyote	CALA1	1
Winter	2	O	Coyote	CALA1	1
Winter	2	S	Coyote	CALA1	1
Winter	3	N	Coyote	CALA1	1
Winter	3	S	Coyote	CALA1	2
Winter	4	G	Coyote	CALA1	1
Winter	4	H	Coyote	CALA1	1
Winter	4	I	Coyote	CALA1	2
Winter	4	K	Coyote	CALA1	2
Winter	4	M	Coyote	CALA1	2
Winter	4	O	Coyote	CALA1	1
Winter	4	R	Coyote	CALA1	1
Winter	4	S	Coyote	CALA1	1
Winter	5	F	Coyote	CALA1	1
Winter	5	I	Coyote	CALA1	1
Winter	5	I	Coyote	CALA1	1
Winter	6	F	Coyote	CALA1	1
Winter	6	O	Coyote	CALA1	1
Winter	7	N	Coyote	CALA1	1
Winter	8	Q	Coyote	CALA1	2
Winter	10	U	Coyote	CALA1	2
Winter	11	O	Coyote	CALA1	1
Winter	11	S	Coyote	CALA1	1
Winter	12	F	Coyote	CALA1	1
Winter	12	G	Coyote	CALA1	1
Winter	13	F	Coyote	CALA1	1
Winter	13	I	Coyote	CALA1	1
Winter	13	L	Coyote	CALA1	1
Winter	14	E	Coyote	CALA1	1
Winter	14	F	Coyote	CALA1	1
Winter	14	G	Coyote	CALA1	2
Winter	14	L	Coyote	CALA1	2
Winter	15	F	Coyote	CALA1	1

Table 3-10. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Winter	15	G	Coyote	CALA1	1
Winter	15	J	Coyote	CALA1	1
Winter	16	K	Coyote	CALA1	1
Winter	16	L	Coyote	CALA1	1
Winter	16	M	Coyote	CALA1	1

Note: RF Grid = grid coordinate; SpecCode = species code

Table 3-11. Waterfowl relative abundance in spring (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	50	Mallard	ANPL1	1	1	1.0000	102	0.98	1273	0.0801
2000	54	Mallard	ANPL1	92	107	0.8598	102	90.20	1273	0.0801
2000	93	Mallard	ANPL1	3	23	0.1304	102	2.94	1273	0.0801
2000	110	Mallard	ANPL1	2	341	0.0059	102	1.96	1273	0.0801
2000	230	Mallard	ANPL1	2	184	0.0109	102	1.96	1273	0.0801
2000	540	Mallard	ANPL1	2	12	0.1667	102	1.96	1273	0.0801
2000	30	Gadwall	ANST1	3	120	0.0250	52	5.77	1273	0.0408
2000	54	Gadwall	ANST1	49	107	0.4579	52	94.23	1273	0.0408
2000	54	Ring-necked Duck	AYCO1	48	107	0.4486	48	100.00	1273	0.0377
2000	20	Common Snipe	GAGA1	15	75	0.2000	31	48.39	1273	0.0244
2000	30	Common Snipe	GAGA1	16	120	0.1333	31	51.61	1273	0.0244
2000	30	American Coot	FUAM1	1	120	0.0083	30	3.33	1273	0.0236
2000	54	American Coot	FUAM1	29	107	0.2710	30	96.67	1273	0.0236
2000	54	Green-winged Teal	ANCR1	28	107	0.2617	28	100.00	1273	0.0220
2000	54	Bufflehead	BUAL1	26	107	0.2430	26	100.00	1273	0.0204
2000	54	Common Merganser	MEME1	24	107	0.2243	24	100.00	1273	0.0189
2000	54	Blue-winged Teal	ANDI1	21	107	0.1963	23	91.30	1273	0.0181
2000	93	Blue-winged Teal	ANDI1	2	23	0.0870	23	8.70	1273	0.0181
2000	30	Cinnamon Teal	ANCY1	2	120	0.0167	15	13.33	1273	0.0118
2000	54	Cinnamon Teal	ANCY1	12	107	0.1121	15	80.00	1273	0.0118
2000	93	Cinnamon Teal	ANCY1	1	23	0.0435	15	6.67	1273	0.0118
2000	30	Killdeer	CHVO1	1	120	0.0083	14	7.14	1273	0.0110
2000	93	Killdeer	CHVO1	8	23	0.3478	14	57.14	1273	0.0110
2000	212	Killdeer	CHVO1	1	103	0.0097	14	7.14	1273	0.0110
2000	324	Killdeer	CHVO1	2	2	1.0000	14	14.29	1273	0.0110
2000	530	Killdeer	CHVO1	1	1	1.0000	14	7.14	1273	0.0110
2000	540	Killdeer	CHVO1	1	12	0.0833	14	7.14	1273	0.0110
2000	54	Common Goldeneye	BUCL1	12	107	0.1121	12	100.00	1273	0.0094
2000	54	Canada Goose	BRCA1	1	107	0.0093	10	10.00	1273	0.0079
2000	93	Canada Goose	BRCA1	9	23	0.3913	10	90.00	1273	0.0079
2000	54	Hooded Merganser	LOCU1	9	107	0.0841	9	100.00	1273	0.0071
2000	30	Pied-billed Grebe	POPO1	1	120	0.0083	8	12.50	1273	0.0063
2000	54	Pied-billed Grebe	POPO1	6	107	0.0561	8	75.00	1273	0.0063
2000	93	Pied-billed Grebe	POPO1	1	23	0.0435	8	12.50	1273	0.0063
2000	54	Redhead	AYAM1	7	107	0.0654	7	100.00	1273	0.0055

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	54	Double-crested Cormorant	PHAU1	5	107	0.0467	6	83.33	1273	0.0047
2000	93	Double-crested Cormorant	PHAU1	1	23	0.0435	6	16.67	1273	0.0047
2000	54	American White Pelican	PEER1	3	107	0.0280	3	100.00	1273	0.0024
2000	54	Great Blue Heron	ARHE1	2	107	0.0187	2	100.00	1273	0.0016
2000	54	Wilson's Phalarope	PHTR1	2	107	0.0187	2	100.00	1273	0.0016
2000	54	American Wigeon	ANAM1	1	107	0.0093	1	100.00	1273	0.0008
2000	54	Lesser Yellowlegs	TRFL1	1	107	0.0093	1	100.00	1273	0.0008
2000	540	Spotted Sandpiper	ACMA1	1	12	0.0833	1	100.00	1273	0.0008
1999	54	Mallard	ANPL1	70	112	0.6250	92	76.09	1302	0.0707
1999	93	Mallard	ANPL1	11	6	1.8333	92	11.96	1302	0.0707
1999	110	Mallard	ANPL1	8	301	0.0266	92	8.70	1302	0.0707
1999	230	Mallard	ANPL1	3	147	0.0204	92	3.26	1302	0.0707
1999	30	Blue-winged Teal	ANDI1	4	107	0.0374	47	8.51	1302	0.0361
1999	54	Blue-winged Teal	ANDI1	43	112	0.3839	47	91.49	1302	0.0361
1999	54	Green-winged Teal	ANCR1	25	112	0.2232	29	86.21	1302	0.0223
1999	54	Ring-necked Duck	AYCO1	29	112	0.2589	29	100.00	1302	0.0223
1999	93	Green-winged Teal	ANCR1	4	6	0.6667	29	13.79	1302	0.0223
1999	54	American Coot	FUAM1	28	112	0.2500	28	100.00	1302	0.0215
1999	10	Common Snipe	GAGA1	2	37	0.0541	26	7.69	1302	0.0200
1999	20	Common Snipe	GAGA1	10	104	0.0962	26	38.46	1302	0.0200
1999	30	Common Snipe	GAGA1	12	107	0.1121	26	46.15	1302	0.0200
1999	212	Common Snipe	GAGA1	2	105	0.0190	26	7.69	1302	0.0200
1999	54	Gadwall	ANST1	18	112	0.1607	18	100.00	1302	0.0138
1999	30	Canada Goose	BRCA1	4	107	0.0374	16	25.00	1302	0.0123
1999	54	Canada Goose	BRCA1	12	112	0.1071	16	75.00	1302	0.0123
1999	30	Cinnamon Teal	ANCY1	2	107	0.0187	12	16.67	1302	0.0092
1999	54	Cinnamon Teal	ANCY1	10	112	0.0893	12	83.33	1302	0.0092
1999	54	Double-crested Cormorant	PHAU1	10	112	0.0893	12	83.33	1302	0.0092
1999	93	Double-crested Cormorant	PHAU1	2	6	0.3333	12	16.67	1302	0.0092
1999	54	Bufflehead	BUAL1	8	112	0.0714	8	100.00	1302	0.0061
1999	54	Killdeer	CHVO1	1	112	0.0089	7	14.29	1302	0.0054
1999	54	American White Pelican	PEER1	7	112	0.0625	7	100.00	1302	0.0054
1999	54	Pied-billed Grebe	POPO1	7	112	0.0625	7	100.00	1302	0.0054

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	93	Killdeer	CHVO1	2	6	0.3333	7	28.57	1302	0.0054
1999	212	Killdeer	CHVO1	2	105	0.0190	7	28.57	1302	0.0054
1999	420	Killdeer	CHVO1	2	6	0.3333	7	28.57	1302	0.0054
1999	30	White-faced Ibis	PLCH1	6	107	0.0561	6	100.00	1302	0.0046
1999	54	Redhead	AYAM1	6	112	0.0536	6	100.00	1302	0.0046
1999	54	Northern Shoveler	ANCL1	3	112	0.0268	3	100.00	1302	0.0023
1999	54	Great Blue Heron	ARHE1	2	112	0.0179	3	66.67	1302	0.0023
1999	54	Lesser Scaup	AYAF1	3	112	0.0268	3	100.00	1302	0.0023
1999	54	Common Goldeneye	BUCL1	3	112	0.0268	3	100.00	1302	0.0023
1999	110	Great Blue Heron	ARHE1	1	301	0.0033	3	33.33	1302	0.0023
1999	30	Solitary Sandpiper	TRSO1	2	107	0.0187	2	100.00	1302	0.0015
1999	54	Lesser Yellowlegs	TRFL1	1	112	0.0089	2	50.00	1302	0.0015
1999	93	Lesser Yellowlegs	TRFL1	1	6	0.1667	2	50.00	1302	0.0015
1999	30	Great egret	CAAL1	1	107	0.0093	1	100.00	1302	0.0008
1999	30	Franklin's Gull	LAPI1	1	107	0.0093	1	100.00	1302	0.0008
1998	20	Mallard	ANPL1	4	121	0.0331	94	4.26	1263	0.0744
1998	43	Mallard	ANPL1	2	3	0.6667	94	2.13	1263	0.0744
1998	54	Mallard	ANPL1	67	113	0.5929	94	71.28	1263	0.0744
1998	93	Mallard	ANPL1	8	21	0.3810	94	8.51	1263	0.0744
1998	110	Mallard	ANPL1	9	337	0.0267	94	9.57	1263	0.0744
1998	211	Mallard	ANPL1	1	30	0.0333	94	1.06	1263	0.0744
1998	212	Mallard	ANPL1	2	96	0.0208	94	2.13	1263	0.0744
1998	230	Mallard	ANPL1	1	176	0.0057	94	1.06	1263	0.0744
1998	54	Ring-necked Duck	AYCO1	49	113	0.4336	49	100.00	1263	0.0388
1998	54	American Coot	FUAM1	39	113	0.3451	39	100.00	1263	0.0309
1998	10	Common Snipe	GAGA1	2	46	0.0435	34	5.88	1263	0.0269
1998	20	Common Snipe	GAGA1	27	121	0.2231	34	79.41	1263	0.0269
1998	30	Common Snipe	GAGA1	3	54	0.0556	34	8.82	1263	0.0269
1998	110	Common Snipe	GAGA1	1	337	0.0030	34	2.94	1263	0.0269
1998	211	Common Snipe	GAGA1	1	30	0.0333	34	2.94	1263	0.0269
1998	54	Green-winged Teal	ANCR1	30	113	0.2655	30	100.00	1263	0.0238
1998	54	Lesser Scaup	AYAF1	30	113	0.2655	30	100.00	1263	0.0238
1998	54	Bufflehead	BUAL1	26	113	0.2301	26	100.00	1263	0.0206
1998	54	Cinnamon Teal	ANCY1	24	113	0.2124	24	100.00	1263	0.0190

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	54	Blue-winged Teal	ANDI1	16	113	0.1416	19	84.21	1263	0.0150
1998	93	Blue-winged Teal	ANDI1	3	21	0.1429	19	15.79	1263	0.0150
1998	20	Killdeer	CHVO1	3	121	0.0248	18	16.67	1263	0.0143
1998	93	Killdeer	CHVO1	11	21	0.5238	18	61.11	1263	0.0143
1998	110	Killdeer	CHVO1	3	337	0.0089	18	16.67	1263	0.0143
1998	420	Killdeer	CHVO1	1	3	0.3333	18	5.56	1263	0.0143
1998	54	Canada Goose	BRCA1	10	113	0.0885	12	83.33	1263	0.0095
1998	324	Canada Goose	BRCA1	2	24	0.0833	12	16.67	1263	0.0095
1998	54	Gadwall	ANST1	7	113	0.0619	7	100.00	1263	0.0055
1998	30	Great Blue Heron	ARHE1	2	54	0.0370	6	33.33	1263	0.0048
1998	54	Great Blue Heron	ARHE1	3	113	0.0265	6	50.00	1263	0.0048
1998	54	Double-crested Cormorant	PHAU1	5	113	0.0442	6	83.33	1263	0.0048
1998	93	Double-crested Cormorant	PHAU1	1	21	0.0476	6	16.67	1263	0.0048
1998	110	Great Blue Heron	ARHE1	1	337	0.0030	6	16.67	1263	0.0048
1998	54	Redhead	AYAM1	5	113	0.0442	5	100.00	1263	0.0040
1998	54	Spotted Sandpiper	ACMA1	1	113	0.0088	2	50.00	1263	0.0016
1998	54	Northern Shoveler	ANCL1	2	113	0.0177	2	100.00	1263	0.0016
1998	54	American White Pelican	PEER1	2	113	0.0177	2	100.00	1263	0.0016
1998	93	Spotted Sandpiper	ACMA1	1	21	0.0476	2	50.00	1263	0.0016
1998	54	Common Goldeneye	BUCL1	0	113	0.0000	0		1263	0.0000
1997	20	Mallard	ANPL1	2	172	0.0116	138	1.45	1580	0.0873
1997	30	Mallard	ANPL1	1	99	0.0101	138	0.72	1580	0.0873
1997	43	Mallard	ANPL1	2	8	0.2500	138	1.45	1580	0.0873
1997	46	Mallard	ANPL1	2	1	2.0000	138	1.45	1580	0.0873
1997	54	Mallard	ANPL1	122	150	0.8133	138	88.41	1580	0.0873
1997	212	Mallard	ANPL1	7	138	0.0507	138	5.07	1580	0.0873
1997	230	Mallard	ANPL1	2	208	0.0096	138	1.45	1580	0.0873
1997	54	Green-winged Teal	ANCR1	92	150	0.6133	92	100.00	1580	0.0582
1997	54	Gadwall	ANST1	56	150	0.3733	56	100.00	1580	0.0354
1997	30	American Coot	FUAM1	3	99	0.0303	43	6.98	1580	0.0272
1997	54	American Coot	FUAM1	40	150	0.2667	43	93.02	1580	0.0272
1997	54	Bufflehead	BUAL1	35	150	0.2333	35	100.00	1580	0.0222

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	93	Killdeer	CHVO1	31	30	1.0333	35	88.57	1580	0.0222
1997	110	Killdeer	CHVO1	1	411	0.0024	35	2.86	1580	0.0222
1997	324	Killdeer	CHVO1	3	37	0.0811	35	8.57	1580	0.0222
1997	54	Greater Scaup	AYMA1	33	150	0.2200	33	100.00	1580	0.0209
1997	54	Common Merganser	MEME1	32	150	0.2133	32	100.00	1580	0.0203
1997	54	Ring-necked Duck	AYCO1	26	150	0.1733	26	100.00	1580	0.0165
1997	20	Common Snipe	GAGA1	8	172	0.0465	20	40.00	1580	0.0127
1997	30	Common Snipe	GAGA1	8	99	0.0808	20	40.00	1580	0.0127
1997	43	Common Snipe	GAGA1	1	8	0.1250	20	5.00	1580	0.0127
1997	110	Common Snipe	GAGA1	1	411	0.0024	20	5.00	1580	0.0127
1997	212	Common Snipe	GAGA1	1	138	0.0072	20	5.00	1580	0.0127
1997	230	Common Snipe	GAGA1	1	208	0.0048	20	5.00	1580	0.0127
1997	54	Cinnamon Teal	ANCY1	17	150	0.1133	17	100.00	1580	0.0108
1997	54	Lesser Scaup	AYAF1	16	150	0.1067	16	100.00	1580	0.0101
1997	54	Redhead	AYAM1	14	150	0.0933	14	100.00	1580	0.0089
1997	54	Pied-billed Grebe	POPO1	14	150	0.0933	14	100.00	1580	0.0089
1997	54	Blue-winged Teal	ANDI1	12	150	0.0800	12	100.00	1580	0.0076
1997	54	Canada Goose	BRCA1	6	150	0.0400	11	54.55	1580	0.0070
1997	93	Canada Goose	BRCA1	1	30	0.0333	11	9.09	1580	0.0070
1997	322	Canada Goose	BRCA1	4	79	0.0506	11	36.36	1580	0.0070
1997	30	Great Blue Heron	ARHE1	1	99	0.0101	7	14.29	1580	0.0044
1997	54	Great Blue Heron	ARHE1	5	150	0.0333	7	71.43	1580	0.0044
1997	54	Ruddy Duck	OXJA1	7	150	0.0467	7	100.00	1580	0.0044
1997	54	Greater Yellowlegs	TRME1	6	150	0.0400	7	85.71	1580	0.0044
1997	93	Greater Yellowlegs	TRME1	1	30	0.0333	7	14.29	1580	0.0044
1997	110	Great Blue Heron	ARHE1	1	411	0.0024	7	14.29	1580	0.0044
1997	54	Double-crested Cormorant	PHAU1	3	150	0.0200	4	75.00	1580	0.0025
1997	93	Spotted Sandpiper	ACMA1	4	30	0.1333	4	100.00	1580	0.0025
1997	322	Double-crested Cormorant	PHAU1	1	79	0.0127	4	25.00	1580	0.0025
1997	54	Common Goldeneye	BUCL1	2	150	0.0133	2	100.00	1580	0.0013
1997	54	Wilson's Phalarope	PHTR1	2	150	0.0133	2	100.00	1580	0.0013
1997	54	Eared grebe	PONI1	2	150	0.0133	2	100.00	1580	0.0013

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	30	Mallard	ANPL1	2	91	0.0220	113	1.77	1726	0.0655
1996	41	Mallard	ANPL1	4	2	2.0000	113	3.54	1726	0.0655
1996	43	Mallard	ANPL1	4	10	0.4000	113	3.54	1726	0.0655
1996	54	Mallard	ANPL1	92	181	0.5083	113	81.42	1726	0.0655
1996	93	Mallard	ANPL1	3	28	0.1071	113	2.65	1726	0.0655
1996	110	Mallard	ANPL1	4	304	0.0132	113	3.54	1726	0.0655
1996	322	Mallard	ANPL1	4	225	0.0178	113	3.54	1726	0.0655
1996	54	Lesser Scaup	AYAF1	100	181	0.5525	100	100.00	1726	0.0579
1996	54	Green-winged Teal	ANCR1	56	181	0.3094	56	100.00	1726	0.0324
1996	54	American Coot	FUAM1	39	181	0.2155	39	100.00	1726	0.0226
1996	20	Killdeer	CHVO1	3	132	0.0227	36	8.33	1726	0.0209
1996	30	Killdeer	CHVO1	5	91	0.0549	36	13.89	1726	0.0209
1996	54	Killdeer	CHVO1	7	181	0.0387	36	19.44	1726	0.0209
1996	93	Killdeer	CHVO1	4	28	0.1429	36	11.11	1726	0.0209
1996	110	Killdeer	CHVO1	3	304	0.0099	36	8.33	1726	0.0209
1996	212	Killdeer	CHVO1	3	143	0.0210	36	8.33	1726	0.0209
1996	322	Killdeer	CHVO1	6	225	0.0267	36	16.67	1726	0.0209
1996	530	Killdeer	CHVO1	1	27	0.0370	36	2.78	1726	0.0209
1996	540	Killdeer	CHVO1	4	12	0.3333	36	11.11	1726	0.0209
1996	54	Redhead	AYAM1	29	181	0.1602	29	100.00	1726	0.0168
1996	54	Gadwall	ANST1	24	181	0.1326	24	100.00	1726	0.0139
1996	20	Common Snipe	GAGA1	15	132	0.1136	21	71.43	1726	0.0122
1996	30	Common Snipe	GAGA1	3	91	0.0330	21	14.29	1726	0.0122
1996	54	Blue-winged Teal	ANDI1	21	181	0.1160	21	100.00	1726	0.0122
1996	93	Common Snipe	GAGA1	2	28	0.0714	21	9.52	1726	0.0122
1996	212	Common Snipe	GAGA1	1	143	0.0070	21	4.76	1726	0.0122
1996	54	Canada Goose	BRCA1	10	181	0.0552	17	58.82	1726	0.0098
1996	93	Canada Goose	BRCA1	5	28	0.1786	17	29.41	1726	0.0098
1996	110	Canada Goose	BRCA1	2	304	0.0066	17	11.76	1726	0.0098
1996	54	Bufflehead	BUAL1	14	181	0.0773	14	100.00	1726	0.0081
1996	54	Cinnamon Teal	ANCY1	10	181	0.0552	10	100.00	1726	0.0058
1996	54	Ring-necked Duck	AYCO1	7	181	0.0387	7	100.00	1726	0.0041
1996	54	Spotted Sandpiper	ACMA1	5	181	0.0276	5	100.00	1726	0.0029

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	54	Black-crowned Night-heron	NYNY1	1	181	0.0055	5	20.00	1726	0.0029
1996	110	Black-crowned Night-heron	NYNY1	3	304	0.0099	5	60.00	1726	0.0029
1996	530	Black-crowned Night-heron	NYNY1	1	27	0.0370	5	20.00	1726	0.0029
1996	20	Ring-billed Gull	LADE1	1	132	0.0076	4	25.00	1726	0.0023
1996	230	Ring-billed Gull	LADE1	3	174	0.0172	4	75.00	1726	0.0023
1996	54	Northern Shoveler	ANCL1	3	181	0.0166	3	100.00	1726	0.0017
1996	54	Great Blue Heron	ARHE1	3	181	0.0166	3	100.00	1726	0.0017
1996	54	Ruddy Duck	OXJA1	2	181	0.0110	2	100.00	1726	0.0012
1996	93	Solitary Sandpiper	TRSO1	1	28	0.0357	1	100.00	1726	0.0006
1995	10	Mallard	ANPL1	2	75	0.0267	129	1.55	1786	0.0722
1995	20	Mallard	ANPL1	2	90	0.0222	129	1.55	1786	0.0722
1995	30	Mallard	ANPL1	6	163	0.0368	129	4.65	1786	0.0722
1995	42	Mallard	ANPL1	2	5	0.4000	129	1.55	1786	0.0722
1995	51	Mallard	ANPL1	3	3	1.0000	129	2.33	1786	0.0722
1995	54	Mallard	ANPL1	95	111	0.8559	129	73.64	1786	0.0722
1995	93	Mallard	ANPL1	6	44	0.1364	129	4.65	1786	0.0722
1995	110	Mallard	ANPL1	4	381	0.0105	129	3.10	1786	0.0722
1995	212	Mallard	ANPL1	3	167	0.0180	129	2.33	1786	0.0722
1995	230	Mallard	ANPL1	6	175	0.0343	129	4.65	1786	0.0722
1995	10	Killdeer	CHVO1	1	75	0.0133	52	1.92	1786	0.0291
1995	30	Killdeer	CHVO1	2	163	0.0123	52	3.85	1786	0.0291
1995	54	Killdeer	CHVO1	1	111	0.0090	52	1.92	1786	0.0291
1995	93	Killdeer	CHVO1	39	44	0.8864	52	75.00	1786	0.0291
1995	212	Killdeer	CHVO1	2	167	0.0120	52	3.85	1786	0.0291
1995	322	Killdeer	CHVO1	2	284	0.0070	52	3.85	1786	0.0291
1995	324	Killdeer	CHVO1	1	31	0.0323	52	1.92	1786	0.0291
1995	420	Killdeer	CHVO1	1	2	0.5000	52	1.92	1786	0.0291
1995	540	Killdeer	CHVO1	3	24	0.1250	52	5.77	1786	0.0291
1995	54	Bufflehead	BUAL1	48	111	0.4324	48	100.00	1786	0.0269
1995	54	Green-winged Teal	ANCR1	46	111	0.4144	46	100.00	1786	0.0258
1995	54	Ring-necked Duck	AYCO1	40	111	0.3604	40	100.00	1786	0.0224
1995	10	Common Snipe	GAGA1	2	75	0.0267	27	7.41	1786	0.0151
1995	20	Common Snipe	GAGA1	11	90	0.1222	27	40.74	1786	0.0151
1995	30	Common Snipe	GAGA1	7	163	0.0429	27	25.93	1786	0.0151

Table 3-11. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	41	Common Snipe	GAGA1	1	1	1.0000	27	3.70	1786	0.0151
1995	110	Common Snipe	GAGA1	2	381	0.0052	27	7.41	1786	0.0151
1995	212	Common Snipe	GAGA1	2	167	0.0120	27	7.41	1786	0.0151
1995	230	Common Snipe	GAGA1	1	175	0.0057	27	3.70	1786	0.0151
1995	322	Common Snipe	GAGA1	1	284	0.0035	27	3.70	1786	0.0151
1995	54	American Coot	FUAM1	19	111	0.1712	19	100.00	1786	0.0106
1995	93	Canada Goose	BRCA1	4	44	0.0909	12	33.33	1786	0.0067
1995	110	Canada Goose	BRCA1	2	381	0.0052	12	16.67	1786	0.0067
1995	322	Canada Goose	BRCA1	2	284	0.0070	12	16.67	1786	0.0067
1995	530	Canada Goose	BRCA1	2	21	0.0952	12	16.67	1786	0.0067
1995	540	Canada Goose	BRCA1	2	24	0.0833	12	16.67	1786	0.0067
1995	54	Lesser Scaup	AYAF1	11	111	0.0991	11	100.00	1786	0.0062
1995	30	Gadwall	ANST1	1	163	0.0061	10	10.00	1786	0.0056
1995	54	Gadwall	ANST1	9	111	0.0811	10	90.00	1786	0.0056
1995	54	Great Blue Heron	ARHE1	2	111	0.0180	8	25.00	1786	0.0045
1995	93	Great Blue Heron	ARHE1	3	44	0.0682	8	37.50	1786	0.0045
1995	110	Great Blue Heron	ARHE1	2	381	0.0052	8	25.00	1786	0.0045
1995	322	Great Blue Heron	ARHE1	1	284	0.0035	8	12.50	1786	0.0045
1995	54	Common Merganser	MEME1	5	111	0.0450	5	100.00	1786	0.0028
1995	93	Lesser Yellowlegs	TRFL1	5	44	0.1136	5	100.00	1786	0.0028
1995	93	Solitary Sandpiper	TRSO1	5	44	0.1136	5	100.00	1786	0.0028
1995	54	Blue-winged Teal	ANDI1	2	111	0.0180	3	66.67	1786	0.0017
1995	54	Pied-billed Grebe	POPO1	3	111	0.0270	3	100.00	1786	0.0017
1995	71	Blue-winged Teal	ANDI1	1	1	1.0000	3	33.33	1786	0.0017
1995	54	Common Goldeneye	BUCL1	2	111	0.0180	2	100.00	1786	0.0011
1995	54	Double-crested Cormorant	PHAU1	1	111	0.0090	2	50.00	1786	0.0011
1995	93	Double-crested Cormorant	PHAU1	1	44	0.0227	2	50.00	1786	0.0011
1995	110	Black-crowned Night-heron	NYNY1	2	381	0.0052	2	100.00	1786	0.0011
1995	54	Greater Scaup	AYMA1	1	111	0.0090	1	100.00	1786	0.0006
1995	54	Eared grebe	PONI1	1	111	0.0090	1	100.00	1786	0.0006
1995	93	Willet	CASE1	1	44	0.0227	1	100.00	1786	0.0006
1995	93	Greater Yellowlegs	TRME1	1	44	0.0227	1	100.00	1786	0.0006
1995	110	American White Pelican	PEER1	1	381	0.0026	1	100.00	1786	0.0006

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-12. Waterfowl relative abundance in summer (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	54	Mallard	ANPL1	274	97	2.8247	302	90.73	1296	0.2330
2000	93	Mallard	ANPL1	28	35	0.8000	302	9.27	1296	0.2330
2000	54	Blue-winged Teal	ANDI1	58	97	0.5979	66	87.88	1296	0.0509
2000	93	Blue-winged Teal	ANDI1	8	35	0.2286	66	12.12	1296	0.0509
2000	54	American Coot	FUAM1	49	97	0.5052	49	100.00	1296	0.0378
2000	54	Pied-billed Grebe	POPO1	37	97	0.3814	37	100.00	1296	0.0285
2000	30	Killdeer	CHVO1	4	112	0.0357	31	12.90	1296	0.0239
2000	54	Killdeer	CHVO1	2	97	0.0206	31	6.45	1296	0.0239
2000	93	Killdeer	CHVO1	25	35	0.7143	31	80.65	1296	0.0239
2000	54	Double-crested Cormorant	PHAU1	7	97	0.0722	20	35.00	1296	0.0154
2000	93	Double-crested Cormorant	PHAU1	13	35	0.3714	20	65.00	1296	0.0154
2000	54	Green-winged Teal	ANCR1	19	97	0.1959	19	100.00	1296	0.0147
2000	54	American White Pelican	PEER1	2	97	0.0206	15	13.33	1296	0.0116
2000	93	American White Pelican	PEER1	13	35	0.3714	15	86.67	1296	0.0116
2000	30	Great Blue Heron	ARHE1	1	112	0.0089	12	8.33	1296	0.0093
2000	54	Great Blue Heron	ARHE1	9	97	0.0928	12	75.00	1296	0.0093
2000	93	Great Blue Heron	ARHE1	2	35	0.0571	12	16.67	1296	0.0093
2000	20	Common Snipe	GAGA1	6	104	0.0577	11	54.55	1296	0.0085
2000	30	Common Snipe	GAGA1	5	112	0.0446	11	45.45	1296	0.0085
2000	54	Ring-necked Duck	AYCO1	5	97	0.0515	5	100.00	1296	0.0039
2000	54	Solitary Sandpiper	TRSO1	4	97	0.0412	5	80.00	1296	0.0039
2000	93	Solitary Sandpiper	TRSO1	1	35	0.0286	5	20.00	1296	0.0039
2000	54	Cinnamon Teal	ANCY1	4	97	0.0412	4	100.00	1296	0.0031
2000	54	Gadwall	ANST1	2	97	0.0206	2	100.00	1296	0.0015
2000	93	Spotted Sandpiper	ACMA1	2	35	0.0571	2	100.00	1296	0.0015
2000	110	Black-crowned Night-heron	NYNY1	2	338	0.0059	2	100.00	1296	0.0015
2000	54	Bufflehead	BUAL1	1	97	0.0103	1	100.00	1296	0.0008
2000	54	Sora	POCA1	1	97	0.0103	1	100.00	1296	0.0008
1999	54	Mallard	ANPL1	137	104	1.3173	166	82.53	1547	0.1073
1999	93	Mallard	ANPL1	29	39	0.7436	166	17.47	1547	0.1073
1999	30	American Coot	FUAM1	6	109	0.0550	59	10.17	1547	0.0381
1999	54	American Coot	FUAM1	53	104	0.5096	59	89.83	1547	0.0381
1999	54	Blue-winged Teal	ANDI1	32	104	0.3077	32	100.00	1547	0.0207

Table 3-12. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	10	Killdeer	CHVO1	1	59	0.0169	30	3.33	1547	0.0194
1999	54	Killdeer	CHVO1	5	104	0.0481	30	16.67	1547	0.0194
1999	93	Killdeer	CHVO1	24	39	0.6154	30	80.00	1547	0.0194
1999	54	Double-crested Cormorant	PHAU1	23	104	0.2212	25	92.00	1547	0.0162
1999	93	Double-crested Cormorant	PHAU1	2	39	0.0513	25	8.00	1547	0.0162
1999	54	Pied-billed Grebe	POPO1	21	104	0.2019	21	100.00	1547	0.0136
1999	54	Canada Goose	BRCA1	12	104	0.1154	17	70.59	1547	0.0110
1999	93	Canada Goose	BRCA1	5	39	0.1282	17	29.41	1547	0.0110
1999	54	Great Blue Heron	ARHE1	4	104	0.0385	8	50.00	1547	0.0052
1999	93	Great Blue Heron	ARHE1	4	39	0.1026	8	50.00	1547	0.0052
1999	20	Common Snipe	GAGA1	1	98	0.0102	7	14.29	1547	0.0045
1999	30	Common Snipe	GAGA1	6	109	0.0550	7	85.71	1547	0.0045
1999	54	Gadwall	ANST1	7	104	0.0673	7	100.00	1547	0.0045
1999	93	Spotted Sandpiper	ACMA1	5	39	0.1282	5	100.00	1547	0.0032
1999	54	Black-crowned Night-heron	NYNY1	2	104	0.0192	3	66.67	1547	0.0019
1999	110	Black-crowned Night-heron	NYNY1	1	411	0.0024	3	33.33	1547	0.0019
1999	54	Green-winged Teal	ANCR1	1	104	0.0096	1	100.00	1547	0.0006
1999	54	Ruddy Duck	OXJA1	1	104	0.0096	1	100.00	1547	0.0006
1999	54	Sora	POCA1	1	104	0.0096	1	100.00	1547	0.0006
1998	54	Mallard	ANPL1	154	131	1.1756	165	93.33	1339	0.1232
1998	93	Mallard	ANPL1	10	28	0.3571	165	6.06	1339	0.1232
1998	110	Mallard	ANPL1	1	352	0.0028	165	0.61	1339	0.1232
1998	54	American Coot	FUAM1	103	131	0.7863	103	100.00	1339	0.0769
1998	54	Blue-winged Teal	ANDI1	55	131	0.4198	58	94.83	1339	0.0433
1998	93	Blue-winged Teal	ANDI1	3	28	0.1071	58	5.17	1339	0.0433
1998	54	Pied-billed Grebe	POPO1	38	131	0.2901	38	100.00	1339	0.0284
1998	54	Killdeer	CHVO1	6	131	0.0458	17	35.29	1339	0.0127
1998	93	Killdeer	CHVO1	10	28	0.3571	17	58.82	1339	0.0127
1998	420	Killdeer	CHVO1	1	6	0.1667	17	5.88	1339	0.0127
1998	54	Spotted Sandpiper	ACMA1	5	131	0.0382	10	50.00	1339	0.0075
1998	54	Double-crested Cormorant	PHAU1	10	131	0.0763	10	100.00	1339	0.0075
1998	93	Spotted Sandpiper	ACMA1	5	28	0.1786	10	50.00	1339	0.0075
1998	54	Great Blue Heron	ARHE1	8	131	0.0611	8	100.00	1339	0.0060
1998	20	Common Snipe	GAGA1	1	74	0.0135	4	25.00	1339	0.0030
1998	30	Common Snipe	GAGA1	3	111	0.0270	4	75.00	1339	0.0030

Table 3-12. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	54	Redhead	AYAM1	4	131	0.0305	4	100.00	1339	0.0030
1998	54	American White Pelican	PEER1	3	131	0.0229	3	100.00	1339	0.0022
1998	54	Green-winged Teal	ANCR1	2	131	0.0153	2	100.00	1339	0.0015
1998	54	Cinnamon Teal	ANCY1	2	131	0.0153	2	100.00	1339	0.0015
1998	54	Gadwall	ANST1	2	131	0.0153	2	100.00	1339	0.0015
1998	54	Canada Goose	BRCA1	2	131	0.0153	2	100.00	1339	0.0015
1998	54	Black-crowned Night-heron	NYNY1	1	131	0.0076	1	100.00	1339	0.0007
1998	54	Lesser Yellowlegs	TRFL1	1	131	0.0076	1	100.00	1339	0.0007
1997	30	Mallard	ANPL1	2	129	0.0155	221	0.90	1361	0.1624
1997	54	Mallard	ANPL1	207	102	2.0294	221	93.67	1361	0.1624
1997	93	Mallard	ANPL1	12	31	0.3871	221	5.43	1361	0.1624
1997	54	Pied-billed Grebe	POPO1	51	102	0.5000	51	100.00	1361	0.0375
1997	54	American Coot	FUAM1	41	102	0.4020	41	100.00	1361	0.0301
1997	54	Blue-winged Teal	ANDI1	24	102	0.2353	25	96.00	1361	0.0184
1997	93	Blue-winged Teal	ANDI1	1	31	0.0323	25	4.00	1361	0.0184
1997	93	Killdeer	CHVO1	22	31	0.7097	22	100.00	1361	0.0162
1997	54	Cinnamon Teal	ANCY1	13	102	0.1275	13	100.00	1361	0.0096
1997	10	Double-crested Cormorant	PHAU1	1	75	0.0133	12	8.33	1361	0.0088
1997	54	Double-crested Cormorant	PHAU1	9	102	0.0882	12	75.00	1361	0.0088
1997	93	Double-crested Cormorant	PHAU1	2	31	0.0645	12	16.67	1361	0.0088
1997	54	Canada Goose	BRCA1	9	102	0.0882	9	100.00	1361	0.0066
1997	20	Common Snipe	GAGA1	4	80	0.0500	6	66.67	1361	0.0044
1997	30	Common Snipe	GAGA1	2	129	0.0155	6	33.33	1361	0.0044
1997	54	Great Blue Heron	ARHE1	2	102	0.0196	4	50.00	1361	0.0029
1997	93	Great Blue Heron	ARHE1	1	31	0.0323	4	25.00	1361	0.0029
1997	110	Great Blue Heron	ARHE1	1	327	0.0031	4	25.00	1361	0.0029
1997	54	Redhead	AYAM1	2	102	0.0196	2	100.00	1361	0.0015
1997	54	American White Pelican	PEER1	2	102	0.0196	2	100.00	1361	0.0015
1997	54	Ruddy Duck	OXJA1	1	102	0.0098	1	100.00	1361	0.0007
1997	93	Spotted Sandpiper	ACMA1	1	31	0.0323	1	100.00	1361	0.0007
1997	93	American Bittern	BOLE1	1	31	0.0323	1	100.00	1361	0.0007

Table 3-12. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	54	American Coot	FUAM1	116	85	1.3647	116	100.00	1609	0.0721
1996	30	Mallard	ANPL1	1	132	0.0076	87	1.15	1609	0.0541
1996	54	Mallard	ANPL1	80	85	0.9412	87	91.95	1609	0.0541
1996	93	Mallard	ANPL1	6	32	0.1875	87	6.90	1609	0.0541
1996	54	Pied-billed Grebe	POPO1	62	85	0.7294	64	96.88	1609	0.0398
1996	93	Pied-billed Grebe	POPO1	2	32	0.0625	64	3.13	1609	0.0398
1996	54	Blue-winged Teal	ANDI1	42	85	0.4941	42	100.00	1609	0.0261
1996	93	Killdeer	CHVO1	23	32	0.7188	28	82.14	1609	0.0174
1996	324	Killdeer	CHVO1	2	35	0.0571	28	7.14	1609	0.0174
1996	410	Killdeer	CHVO1	3	5	0.6000	28	10.71	1609	0.0174
1996	54	Redhead	AYAM1	11	85	0.1294	11	100.00	1609	0.0068
1996	54	Great Blue Heron	ARHE1	4	85	0.0471	7	57.14	1609	0.0044
1996	93	Great Blue Heron	ARHE1	2	32	0.0625	7	28.57	1609	0.0044
1996	322	Great Blue Heron	ARHE1	1	119	0.0084	7	14.29	1609	0.0044
1996	54	Ruddy Duck	OXJA1	5	85	0.0588	5	100.00	1609	0.0031
1996	54	American Wigeon	ANAM1	3	85	0.0353	3	100.00	1609	0.0019
1996	54	Gadwall	ANST1	2	85	0.0235	2	100.00	1609	0.0012
1996	20	Common Snipe	GAGA1	1	60	0.0167	1	100.00	1609	0.0006
1996	54	Spotted Sandpiper	ACMA1	1	85	0.0118	1	100.00	1609	0.0006
1996	54	Wood duck	AISP1	1	85	0.0118	1	100.00	1609	0.0006
1996	54	Ring-necked Duck	AYCO1	1	85	0.0118	1	100.00	1609	0.0006
1996	93	Semipalmated Plover	CHSE1	1	32	0.0313	1	100.00	1609	0.0006
1996	110	Black-crowned Night-heron	NYNY1	1	451	0.0022	1	100.00	1609	0.0006
1995	20	Mallard	ANPL1	2	102	0.0196	45	4.44	2269	0.0198
1995	30	Mallard	ANPL1	1	109	0.0092	45	2.22	2269	0.0198
1995	54	Mallard	ANPL1	41	77	0.5325	45	91.11	2269	0.0198
1995	211	Mallard	ANPL1	1	38	0.0263	45	2.22	2269	0.0198
1995	54	Pied-billed Grebe	POPO1	42	77	0.5455	42	100.00	2269	0.0185
1995	54	American White Pelican	PEER1	6	77	0.0779	24	25.00	2269	0.0106
1995	322	American White Pelican	PEER1	18	299	0.0602	24	75.00	2269	0.0106
1995	54	American Coot	FUAM1	20	77	0.2597	20	100.00	2269	0.0088
1995	93	Killdeer	CHVO1	7	16	0.4375	16	43.75	2269	0.0071
1995	322	Killdeer	CHVO1	1	299	0.0033	16	6.25	2269	0.0071
1995	420	Killdeer	CHVO1	1	2	0.5000	16	6.25	2269	0.0071

Table 3-12. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	520	Killdeer	CHVO1	1	1	1.0000	16	6.25	2269	0.0071
1995	530	Killdeer	CHVO1	6	12	0.5000	16	37.50	2269	0.0071
1995	20	Common Snipe	GAGA1	14	102	0.1373	14	100.00	2269	0.0062
1995	54	Double-crested Cormorant	PHAU1	9	77	0.1169	11	81.82	2269	0.0048
1995	212	Double-crested Cormorant	PHAU1	2	753	0.0027	11	18.18	2269	0.0048
1995	54	Blue-winged Teal	ANDI1	9	77	0.1169	9	100.00	2269	0.0040
1995	54	Great Blue Heron	ARHE1	7	77	0.0909	9	77.78	2269	0.0040
1995	93	Great Blue Heron	ARHE1	2	16	0.1250	9	22.22	2269	0.0040
1995	54	Gadwall	ANST1	1	77	0.0130	1	100.00	2269	0.0004
1995	93	Solitary Sandpiper	TRSO1	1	16	0.0625	1	100.00	2269	0.0004
1995	210	Spotted Sandpiper	ACMA1	1	4	0.2500	1	100.00	2269	0.0004

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-13. Waterfowl relative abundance in fall (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	54	Mallard	ANPL1	104	113	0.9204	104	100.00	1132	0.0919
2000	54	Gadwall	ANST1	18	113	0.1593	18	100.00	1132	0.0159
2000	54	Blue-winged Teal	ANDI1	13	113	0.1150	13	100.00	1132	0.0115
2000	54	Green-winged Teal	ANCR1	12	113	0.1062	12	100.00	1132	0.0106
2000	54	Pied-billed Grebe	POPO1	12	113	0.1062	12	100.00	1132	0.0106
2000	54	Bufflehead	BUAL1	5	113	0.0442	5	100.00	1132	0.0044
2000	54	Killdeer	CHVO1	1	113	0.0088	5	20.00	1132	0.0044
2000	93	Killdeer	CHVO1	4	5	0.8000	5	80.00	1132	0.0044
2000	54	Northern Shoveler	ANCL1	4	113	0.0354	4	100.00	1132	0.0035
2000	54	Ring-necked Duck	AYCO1	4	113	0.0354	4	100.00	1132	0.0035
2000	54	American Coot	FUAM1	4	113	0.0354	4	100.00	1132	0.0035
2000	30	Common Snipe	GAGA1	2	87	0.0230	3	66.67	1132	0.0027
2000	54	Great Blue Heron	ARHE1	3	113	0.0265	3	100.00	1132	0.0027
2000	54	Common Snipe	GAGA1	1	113	0.0088	3	33.33	1132	0.0027
2000	54	Lesser Yellowlegs	TRFL1	3	113	0.0265	3	100.00	1132	0.0027
1999	10	Mallard	ANPL1	2	49	0.0408	83	2.41	1356	0.0612
1999	54	Mallard	ANPL1	80	113	0.7080	83	96.39	1356	0.0612
1999	93	Mallard	ANPL1	1	4	0.2500	83	1.20	1356	0.0612
1999	54	Bufflehead	BUAL1	39	113	0.3451	39	100.00	1356	0.0288
1999	54	Ring-necked Duck	AYCO1	33	113	0.2920	33	100.00	1356	0.0243
1999	54	American Coot	FUAM1	33	113	0.2920	33	100.00	1356	0.0243
1999	54	Blue-winged Teal	ANDI1	23	113	0.2035	23	100.00	1356	0.0170
1999	54	Pied-billed Grebe	POPO1	19	113	0.1681	19	100.00	1356	0.0140
1999	54	Green-winged Teal	ANCR1	9	113	0.0796	9	100.00	1356	0.0066
1999	54	American Wigeon	ANAM1	5	113	0.0442	5	100.00	1356	0.0037
1999	54	Black-crowned Night-heron	NYNY1	2	113	0.0177	3	66.67	1356	0.0022
1999	212	Black-crowned Night-heron	NYNY1	1	164	0.0061	3	33.33	1356	0.0022
1999	30	Eared grebe	PONI1	1	125	0.0080	1	100.00	1356	0.0007
1999	54	Cinnamon Teal	ANCY1	1	113	0.0088	1	100.00	1356	0.0007
1999	54	Great Blue Heron	ARHE1	1	113	0.0088	1	100.00	1356	0.0007
1999	93	Ring-billed Gull	LADE1	1	4	0.2500	1	100.00	1356	0.0007
1999	93	Double-crested Cormorant	PHAU1	1	4	0.2500	1	100.00	1356	0.0007
1999	110	Sora	POCA1	1	323	0.0031	1	100.00	1356	0.0007

Table 3-13. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	54	Mallard	ANPL1	55	103	0.5340	61	90.16	1210	0.0504
1998	93	Mallard	ANPL1	2	2	1.0000	61	3.28	1210	0.0504
1998	212	Mallard	ANPL1	4	93	0.0430	61	6.56	1210	0.0504
1998	54	Bufflehead	BUAL1	40	103	0.3883	40	100.00	1210	0.0331
1998	54	American Coot	FUAM1	34	103	0.3301	34	100.00	1210	0.0281
1998	54	Green-winged Teal	ANCR1	24	103	0.2330	24	100.00	1210	0.0198
1998	54	Pied-billed Grebe	POPO1	21	103	0.2039	21	100.00	1210	0.0174
1998	30	Blue-winged Teal	ANDI1	2	90	0.0222	16	12.50	1210	0.0132
1998	54	Blue-winged Teal	ANDI1	14	103	0.1359	16	87.50	1210	0.0132
1998	54	Ring-necked Duck	AYCO1	10	103	0.0971	10	100.00	1210	0.0083
1998	54	Killdeer	CHVO1	1	103	0.0097	3	33.33	1210	0.0025
1998	93	Killdeer	CHVO1	2	2	1.0000	3	66.67	1210	0.0025
1998	230	Sora	POCA1	2	164	0.0122	2	100.00	1210	0.0017
1998	20	Common Snipe	GAGA1	1	88	0.0114	1	100.00	1210	0.0008
1998	54	American Wigeon	ANAM1	1	103	0.0097	1	100.00	1210	0.0008
1998	54	Great Blue Heron	ARHE1	1	103	0.0097	1	100.00	1210	0.0008
1998	54	Common Goldeneye	BUCL1	1	103	0.0097	1	100.00	1210	0.0008
1997	20	Mallard	ANPL1	1	95	0.0105	100	1.00	1221	0.0819
1997	54	Mallard	ANPL1	64	82	0.7805	100	64.00	1221	0.0819
1997	93	Mallard	ANPL1	35	18	1.9444	100	35.00	1221	0.0819
1997	54	Gadwall	ANST1	64	82	0.7805	64	100.00	1221	0.0524
1997	54	Ring-necked Duck	AYCO1	60	82	0.7317	60	100.00	1221	0.0491
1997	54	Bufflehead	BUAL1	57	82	0.6951	57	100.00	1221	0.0467
1997	93	Killdeer	CHVO1	28	18	1.5556	29	96.55	1221	0.0238
1997	110	Killdeer	CHVO1	1	313	0.0032	29	3.45	1221	0.0238
1997	54	Blue-winged Teal	ANDI1	21	82	0.2561	25	84.00	1221	0.0205
1997	93	Blue-winged Teal	ANDI1	4	18	0.2222	25	16.00	1221	0.0205
1997	54	American Coot	FUAM1	18	82	0.2195	18	100.00	1221	0.0147
1997	54	Pied-billed Grebe	POPO1	14	82	0.1707	14	100.00	1221	0.0115
1997	54	Green-winged Teal	ANCR1	12	82	0.1463	12	100.00	1221	0.0098
1997	54	Lesser Scaup	AYAF1	2	82	0.0244	2	100.00	1221	0.0016
1997	20	Virginia Rail	RALI1	1	95	0.0105	1	100.00	1221	0.0008
1997	54	Western grebe	AEOC1	1	82	0.0122	1	100.00	1221	0.0008
1997	54	Northern Shoveler	ANCL1	1	82	0.0122	1	100.00	1221	0.0008
1997	54	Common Merganser	MEME1	1	82	0.0122	1	100.00	1221	0.0008

Table 3-13. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	30	Mallard	ANPL1	1	95	0.0105	104	0.96	1418	0.0733
1996	54	Mallard	ANPL1	101	103	0.9806	104	97.12	1418	0.0733
1996	110	Mallard	ANPL1	2	300	0.0067	104	1.92	1418	0.0733
1996	324	Canada Goose	BRCA1	67	41	1.6341	67	100.00	1418	0.0472
1996	54	Pied-billed Grebe	POPO1	27	103	0.2621	27	100.00	1418	0.0190
1996	54	American Coot	FUAM1	27	103	0.2621	27	100.00	1418	0.0190
1996	54	Bufflehead	BUAL1	26	103	0.2524	26	100.00	1418	0.0183
1996	54	Green-winged Teal	ANCR1	16	103	0.1553	16	100.00	1418	0.0113
1996	54	Ruddy Duck	OXJA1	10	103	0.0971	10	100.00	1418	0.0071
1996	54	Blue-winged Teal	ANDI1	8	103	0.0777	8	100.00	1418	0.0056
1996	54	Northern Pintail	ANAC1	8	103	0.0777	8	100.00	1418	0.0056
1996	110	Green-tailed Towhee	PICH1	3	300	0.0100	8	37.50	1418	0.0056
1996	93	Killdeer	CHVO1	5	4	1.2500	7	71.43	1418	0.0049
1996	212	Killdeer	CHVO1	2	101	0.0198	7	28.57	1418	0.0049
1996	54	Redhead	AYAM1	5	103	0.0485	5	100.00	1418	0.0035
1996	30	Common Snipe	GAGA1	2	95	0.0211	4	50.00	1418	0.0028
1996	93	Common Snipe	GAGA1	1	4	0.2500	4	25.00	1418	0.0028
1996	110	Common Snipe	GAGA1	1	300	0.0033	4	25.00	1418	0.0028
1996	54	Ring-necked Duck	AYCO1	3	103	0.0291	3	100.00	1418	0.0021
1996	54	Ring-billed Gull	LADE1	1	103	0.0097	1	100.00	1418	0.0007
1996	54	Common Goldeneye	BUCL1	1	103	0.0097	1	100.00	1418	0.0007
1996	54	Lesser Scaup	AYAF1	1	103	0.0097	1	100.00	1418	0.0007
1996	54	Great Blue Heron	ARHE1	1	103	0.0097	1	100.00	1418	0.0007
1996	54	Wood duck	AISP1	1	103	0.0097	1	100.00	1418	0.0007
1995	54	Mallard	ANPL1	144	134	1.0746	152	94.736842	1837	0.0827
1995	93	Mallard	ANPL1	7	12	0.5833	152	4.6052632	1837	0.0827
1995	420	Mallard	ANPL1	1	12	0.0833	152	0.6578947	1837	0.0827
1995	54	American Coot	FUAM1	48	134	0.3582	48	100	1837	0.0261
1995	54	Blue-winged Teal	ANDI1	28	134	0.2090	28	100	1837	0.0152
1995	54	Bufflehead	BUAL1	27	134	0.2015	27	100	1837	0.0147
1995	54	Green-winged Teal	ANCR1	22	134	0.1642	22	100	1837	0.0120
1995	54	Ring-necked Duck	AYCO1	18	134	0.1343	18	100	1837	0.0098
1995	54	Pied-billed Grebe	POPO1	13	134	0.0970	13	100	1837	0.0071
1995	54	American Wigeon	ANAM1	12	134	0.0896	12	100	1837	0.0065

Table 3-13. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Total Obs Y	RA in Hab	Time SY	Obs Min Season
1995	54	Killdeer	CHVO1	2	134	0.0149	11	18.181818	1837	0.0060
1995	93	Killdeer	CHVO1	9	12	0.7500	11	81.818182	1837	0.0060
1995	54	Gadwall	ANST1	5	134	0.0373	5	100	1837	0.0027
1995	54	Common Goldeneye	BUCL1	5	134	0.0373	5	100	1837	0.0027
1995	54	Double-crested Cormorant	PHAU1	3	134	0.0224	3	100	1837	0.0016
1995	93	Great Blue Heron	ARHE1	1	12	0.0833	1	100	1837	0.0005

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-14. Waterfowl relative abundance in winter (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	30	Ring-necked Duck	AYCO1	14	101	0.1386	38	36.84	1081	0.0352
2000	54	Ring-necked Duck	AYCO1	24	50	0.4800	38	63.16	1081	0.0352
2000	30	Mallard	ANPL1	7	101	0.0693	36	19.44	1081	0.0333
2000	54	Mallard	ANPL1	29	50	0.5800	36	80.56	1081	0.0333
2000	54	Redhead	AYAM1	19	50	0.3800	19	100.00	1081	0.0176
2000	30	Common Goldeneye	BUCL1	4	101	0.0396	14	28.57	1081	0.0130
2000	54	Common Goldeneye	BUCL1	10	50	0.2000	14	71.43	1081	0.0130
2000	30	Killdeer	CHVO1	1	101	0.0099	5	20.00	1081	0.0046
2000	93	Killdeer	CHVO1	4	1	4.0000	5	80.00	1081	0.0046
2000	30	Canada Goose	BRCA1	2	101	0.0198	2	100.00	1081	0.0019
2000	54	Green-winged Teal	ANCR1	2	50	0.0400	2	100.00	1081	0.0019
2000	30	Common Merganser	MEME1	1	101	0.0099	1	100.00	1081	0.0009
2000	54	Cinnamon Teal	ANCY1	1	50	0.0200	1	100.00	1081	0.0009
1999	54	Canada Goose	BRCA1	90	61	1.4754	90	100.00	1053	0.0855
1999	54	Mallard	ANPL1	43	61	0.7049	43	100.00	1053	0.0408
1999	54	Bufflehead	BUAL1	13	61	0.2131	13	100.00	1053	0.0123
1999	54	Ring-necked Duck	AYCO1	11	61	0.1803	11	100.00	1053	0.0104
1999	54	Green-winged Teal	ANCR1	8	61	0.1311	8	100.00	1053	0.0076
1999	54	Redhead	AYAM1	3	61	0.0492	3	100.00	1053	0.0028
1999	54	Wood duck	AISP1	1	61	0.0164	1	100.00	1053	0.0009
1999	54	Gadwall	ANST1	1	61	0.0164	1	100.00	1053	0.0009
1999	54	Common Goldeneye	BUCL1	1	61	0.0164	1	100.00	1053	0.0009
1999	54	American Coot	FUAM1	1	61	0.0164	1	100.00	1053	0.0009
1998	54	Mallard	ANPL1	50	34	1.4706	50	100.00	1092	0.0458
1998	54	Redhead	AYAM1	15	34	0.4412	15	100.00	1092	0.0137
1998	54	Ring-necked Duck	AYCO1	14	34	0.4118	14	100.00	1092	0.0128
1998	54	Common Goldeneye	BUCL1	9	34	0.2647	9	100.00	1092	0.0082
1998	54	Canada Goose	BRCA1	4	34	0.1176	4	100.00	1092	0.0037
1998	54	Hooded Merganser	LOCU1	4	34	0.1176	4	100.00	1092	0.0037
1998	20	Common Snipe	GAGA1	2	126	0.0159	2	100.00	1092	0.0018
1998	54	Green-winged Teal	ANCR1	2	34	0.0588	2	100.00	1092	0.0018
1998	54	Lesser Scaup	AYAF1	2	34	0.0588	2	100.00	1092	0.0018
1998	54	Common Merganser	MEME1	1	34	0.0294	1	100.00	1092	0.0009

Table 3-14. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	54	Redhead	AYAM1	54	62	0.8710	54	100.00	1112	0.0486
1997	30	Green-winged Teal	ANCR1	2	48	0.0417	17	11.76	1112	0.0153
1997	54	Green-winged Teal	ANCR1	15	62	0.2419	17	88.24	1112	0.0153
1997	54	Mallard	ANPL1	17	62	0.2742	17	100.00	1112	0.0153
1997	54	Common Goldeneye	BUCL1	9	62	0.1452	9	100.00	1112	0.0081
1997	20	Common Snipe	GAGA1	1	127	0.0079	1	100.00	1112	0.0009
1997	54	Bufflehead	BUAL1	1	62	0.0161	1	100.00	1112	0.0009
1996	54	Redhead	AYAM1	63	42	1.5000	63	100.00	1243	0.0507
1996	30	Mallard	ANPL1	1	81	0.0123	29	3.45	1243	0.0233
1996	54	Mallard	ANPL1	28	42	0.6667	29	96.55	1243	0.0233
1996	54	Green-winged Teal	ANCR1	14	42	0.3333	14	100.00	1243	0.0113
1996	54	American Wigeon	ANAM1	2	42	0.0476	2	100.00	1243	0.0016
1996	54	Northern Shoveler	ANCL1	2	42	0.0476	2	100.00	1243	0.0016
1995	30	Mallard	ANPL1	1	124	0.0081	62	1.612903226	1496	0.0414
1995	43	Mallard	ANPL1	1	1	1.0000	62	1.612903226	1496	0.0414
1995	54	Mallard	ANPL1	56	65	0.8615	62	90.32258065	1496	0.0414
1995	110	Mallard	ANPL1	4	333	0.0120	62	6.451612903	1496	0.0414
1995	10	Canada Goose	BRCA1	5	72	0.0694	31	16.12903226	1496	0.0207
1995	30	Canada Goose	BRCA1	18	124	0.1452	31	58.06451613	1496	0.0207
1995	212	Canada Goose	BRCA1	8	162	0.0494	31	25.80645161	1496	0.0207
1995	54	Lesser Scaup	AYAF1	10	65	0.1538	10	100	1496	0.0067
1995	54	Northern Pintail	ANAC1	5	65	0.0769	5	100	1496	0.0033
1995	54	American Wigeon	ANAM1	3	65	0.0462	3	100	1496	0.0020
1995	54	Blue-winged Teal	ANDI1	3	65	0.0462	3	100	1496	0.0020

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-15. Seasonal waterfowl area use (1997-2000).

Season	RF Grid N.	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	2	T	American Coot	FUAM1	58
Spring	2	T	Blue-winged Teal	ANDI1	2
Spring	2	T	Bufflehead	BUAL1	22
Spring	2	T	Canada Goose	BRCA1	2
Spring	2	T	Cinnamon Teal	ANCY1	6
Spring	2	T	Common Merganser	MEME1	49
Spring	2	T	Double-crested Cormorant	PHAU1	1
Spring	2	T	Gadwall	ANST1	20
Spring	2	T	Great Blue Heron	ARHE1	1
Spring	2	T	Green-winged Teal	ANCR1	16
Spring	2	T	Hooded Merganser	LOCU1	6
Spring	2	T	Lesser Scaup	AYAF1	41
Spring	2	T	Mallard	ANPL1	34
Spring	2	T	Pied-billed Grebe	POPO1	11
Spring	2	T	Ring-necked Duck	AYCO1	77
Spring	2	T	Ruddy Duck	OXJA1	4
Spring	2	U	American Coot	FUAM1	37
Spring	2	U	Blue-winged Teal	ANDI1	6
Spring	2	U	Bufflehead	BUAL1	1
Spring	2	U	Canada Goose	BRCA1	5
Spring	2	U	Canvasback	AYVA1	2
Spring	2	U	Cinnamon Teal	ANCY1	2
Spring	2	U	Common Merganser	MEME1	14
Spring	2	U	Gadwall	ANST1	4
Spring	2	U	Hooded Merganser	LOCU1	3
Spring	2	U	Lesser Scaup	AYAF1	6
Spring	2	U	Mallard	ANPL1	10
Spring	2	U	Pied-billed Grebe	POPO1	13
Spring	2	U	Redhead	AYAM1	2
Spring	2	U	Ring-necked Duck	AYCO1	12
Spring	3	R	American Coot	FUAM1	7
Spring	3	R	Bufflehead	BUAL1	1
Spring	3	R	Canada Goose	BRCA1	4
Spring	3	R	Common Goldeneye	BUCL1	1
Spring	3	R	Common Merganser	MEME1	3
Spring	3	R	Gadwall	ANST1	15
Spring	3	R	Lesser Scaup	AYAF1	1
Spring	3	R	Mallard	ANPL1	14
Spring	3	R	Pied-billed Grebe	POPO1	2
Spring	3	R	Ring-necked Duck	AYCO1	11
Spring	3	S	American Coot	FUAM1	3
Spring	3	S	Mallard	ANPL1	1
Spring	4	R	American Coot	FUAM1	6
Spring	4	R	Blue-winged Teal	ANDI1	4
Spring	4	R	Bufflehead	BUAL1	2
Spring	4	R	Green-winged Teal	ANCR1	11

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	4	R	Lesser Scaup	AYAF1	5
Spring	4	R	Pied-billed Grebe	POPO1	9
Spring	4	R	Redhead	AYAM1	6
Spring	4	R	Ring-necked Duck	AYCO1	12
Spring	4	S	American Coot	FUAM1	4
Spring	4	S	Gadwall	ANST1	2
Spring	4	S	Pied-billed Grebe	POPO1	1
Spring	7	N	American Coot	FUAM1	1
Spring	7	N	Canada Goose	BRCA1	2
Spring	7	N	Cinnamon Teal	ANCY1	2
Spring	7	N	Gadwall	ANST1	2
Spring	7	N	Green-winged Teal	ANCR1	2
Spring	7	N	Mallard	ANPL1	5
Spring	7	N	Pied-billed Grebe	POPO1	5
Spring	7	N	Ring-necked Duck	AYCO1	2
Spring	7	P	American Coot	FUAM1	2
Spring	7	P	Bufflehead	BUAL1	22
Spring	7	P	Canada Goose	BRCA1	10
Spring	7	P	Cinnamon Teal	ANCY1	6
Spring	7	P	Common Goldeneye	BUCL1	5
Spring	7	P	Common Merganser	MEME1	3
Spring	7	P	Gadwall	ANST1	20
Spring	7	P	Green-winged Teal	ANCR1	49
Spring	7	P	Lesser Scaup	AYAF1	2
Spring	7	P	Mallard	ANPL1	43
Spring	7	P	Northern Shoveler	ANCL1	1
Spring	7	P	Pied-billed Grebe	POPO1	11
Spring	7	P	Ring-necked Duck	AYCO1	9
Spring	7	U	Great Blue Heron	ARHE1	1
Spring	9	E	Mallard	ANPL1	2
Spring	10	O	American Coot	FUAM1	1
Spring	10	O	Blue-winged Teal	ANDI1	5
Spring	10	O	Canada Goose	BRCA1	14
Spring	10	O	Cinnamon Teal	ANCY1	9
Spring	10	O	Gadwall	ANST1	38
Spring	10	O	Great Blue Heron	ARHE1	1
Spring	10	O	Lesser Scaup	AYAF1	2
Spring	10	O	Mallard	ANPL1	21
Spring	10	O	Pied-billed Grebe	POPO1	2
Spring	10	O	Ring-necked Duck	AYCO1	9
Spring	10	P	Gadwall	ANST1	8
Spring	10	P	Great Blue Heron	ARHE1	1
Spring	10	P	Mallard	ANPL1	12
Spring	11	N	Canada Goose	BRCA1	2
Spring	11	N	Mallard	ANPL1	1
Spring	11	N	Pied-billed Grebe	POPO1	1

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	11	P	Mallard	ANPL1	1
Spring	11	P	Redhead	AYAM1	2
Spring	11	Q	Bufflehead	BUAL1	10
Spring	11	Q	Canada Goose	BRCA1	2
Spring	11	Q	Gadwall	ANST1	16
Spring	11	Q	Great Blue Heron	ARHE1	2
Spring	11	Q	Lesser Scaup	AYAF1	15
Spring	11	Q	Mallard	ANPL1	14
Spring	11	Q	Northern Pintail	ANAC1	6
Spring	11	Q	Ring-necked Duck	AYCO1	1
Spring	12	F	Mallard	ANPL1	2
Spring	12	L	American Wigeon	ANAM1	2
Spring	12	L	Bufflehead	BUAL1	2
Spring	12	L	Canada Goose	BRCA1	2
Spring	12	L	Greater Yellowlegs	TRME1	1
Spring	12	L	Mallard	ANPL1	12
Spring	12	L	Pied-billed Grebe	POPO1	2
Spring	12	L	Ring-necked Duck	AYCO1	5
Spring	12	N	American Coot	FUAM1	3
Spring	12	N	Green-winged Teal	ANCR1	4
Spring	12	N	Mallard	ANPL1	2
Spring	12	O	American Coot	FUAM1	2
Spring	12	O	Blue-winged Teal	ANDI1	2
Spring	12	O	Greater Scaup	AYMA1	2
Spring	12	O	Green-winged Teal	ANCR1	10
Spring	12	O	Lesser Scaup	AYAF1	4
Spring	12	O	Mallard	ANPL1	14
Spring	12	O	Pied-billed Grebe	POPO1	4
Spring	12	O	Redhead	AYAM1	1
Spring	12	O	Ring-necked Duck	AYCO1	9
Spring	12	P	Blue-winged Teal	ANDI1	17
Spring	12	P	Bufflehead	BUAL1	9
Spring	12	P	Canada Goose	BRCA1	3
Spring	12	P	Common Merganser	MEME1	2
Spring	12	P	Double-crested Cormorant	PHAU1	1
Spring	12	P	Gadwall	ANST1	10
Spring	12	P	Great Blue Heron	ARHE1	2
Spring	12	P	Green-winged Teal	ANCR1	22
Spring	12	P	Lesser Scaup	AYAF1	2
Spring	12	P	Lesser Yellowlegs	TRFL1	1
Spring	12	P	Mallard	ANPL1	19
Spring	12	P	Pied-billed Grebe	POPO1	1
Spring	12	P	Ring-necked Duck	AYCO1	16
Spring	12	P	Wilson's Phalarope	PHTR1	6
Spring	12	Q	American Wigeon	ANAM1	2
Spring	12	Q	Blue-winged Teal	ANDI1	7

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	12	Q	Bufflehead	BUAL1	25
Spring	12	Q	Canada Goose	BRCA1	6
Spring	12	Q	Cinnamon Teal	ANCY1	1
Spring	12	Q	Common Goldeneye	BUCL1	12
Spring	12	Q	Double-crested Cormorant	PHAU1	9
Spring	12	Q	Gadwall	ANST1	2
Spring	12	Q	Great Blue Heron	ARHE1	1
Spring	12	Q	Greater Scaup	AYMA1	6
Spring	12	Q	Green-winged Teal	ANCR1	32
Spring	12	Q	Hooded Merganser	LOCU1	3
Spring	12	Q	Lesser Scaup	AYAF1	2
Spring	12	Q	Mallard	ANPL1	49
Spring	12	Q	Ring-necked Duck	AYCO1	4
Spring	13	H	Great Blue Heron	ARHE1	1
Spring	13	H	Green-winged Teal	ANCR1	2
Spring	13	H	Mallard	ANPL1	8
Spring	13	H	Ring-necked Duck	AYCO1	4
Spring	13	L	American Coot	FUAM1	2
Spring	13	L	Bufflehead	BUAL1	2
Spring	13	L	Gadwall	ANST1	8
Spring	13	L	Lesser Scaup	AYAF1	3
Spring	13	L	Mallard	ANPL1	15
Spring	13	L	Pied-billed Grebe	POPO1	4
Spring	13	L	Ring-necked Duck	AYCO1	2
Spring	13	P	Canada Goose	BRCA1	2
Spring	13	Q	American White Pelican	PEER1	1
Spring	13	Q	Double-crested Cormorant	PHAU1	9
Spring	13	Q	Lesser Scaup	AYAF1	1
Spring	15	G	Mallard	ANPL1	2
Summer	2	T	American Coot	FUAM1	134
Summer	2	T	American White Pelican	PEER1	1
Summer	2	T	Blue-winged Teal	ANDI1	16
Summer	2	T	Canada Goose	BRCA1	4
Summer	2	T	Cinnamon Teal	ANCY1	1
Summer	2	T	Double-crested Cormorant	PHAU1	5
Summer	2	T	Gadwall	ANST1	8
Summer	2	T	Great Blue Heron	ARHE1	2
Summer	2	T	Green-winged Teal	ANCR1	8
Summer	2	T	Mallard	ANPL1	237
Summer	2	T	Redhead	AYAM1	6
Summer	2	T	Ruddy Duck	OXJA1	3
Summer	2	T	Wilson's Phalarope	PHTR1	1
Summer	2	U	American Coot	FUAM1	15
Summer	2	U	Blue-winged Teal	ANDI1	19
Summer	2	U	Bufflehead	BUAL1	1

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Summer	2	U	Double-crested Cormorant	PHAU1	4
Summer	2	U	Gadwall	ANST1	9
Summer	2	U	Great Blue Heron	ARHE1	1
Summer	2	U	Mallard	ANPL1	13
Summer	2	U	Pied-billed Grebe	POPO1	36
Summer	2	U	Ring-necked Duck	AYCO1	3
Summer	3	F	Mallard	ANPL1	1
Summer	3	R	American Coot	FUAM1	13
Summer	3	R	Blue-winged Teal	ANDI1	1
Summer	3	R	Double-crested Cormorant	PHAU1	1
Summer	3	R	Great Blue Heron	ARHE1	1
Summer	3	R	Mallard	ANPL1	4
Summer	3	R	Pied-billed Grebe	POPO1	22
Summer	3	S	Black-crowned Night-heron	NYNY1	1
Summer	3	S	Double-crested Cormorant	PHAU1	3
Summer	3	S	Mallard	ANPL1	7
Summer	4	R	American Coot	FUAM1	7
Summer	4	R	Blue-winged Teal	ANDI1	1
Summer	4	R	Mallard	ANPL1	4
Summer	4	R	Pied-billed Grebe	POPO1	17
Summer	4	S	American Coot	FUAM1	1
Summer	4	S	Mallard	ANPL1	2
Summer	7	N	American Coot	FUAM1	8
Summer	7	N	Double-crested Cormorant	PHAU1	3
Summer	7	N	Mallard	ANPL1	13
Summer	7	N	Pied-billed Grebe	POPO1	4
Summer	7	P	American Coot	FUAM1	2
Summer	7	P	Double-crested Cormorant	PHAU1	3
Summer	7	P	Great Blue Heron	ARHE1	1
Summer	7	P	Mallard	ANPL1	12
Summer	7	P	Pied-billed Grebe	POPO1	2
Summer	10	O	Blue-winged Teal	ANDI1	35
Summer	10	O	Cinnamon Teal	ANCY1	5
Summer	10	O	Gadwall	ANST1	6
Summer	10	O	Great Blue Heron	ARHE1	1
Summer	10	O	Mallard	ANPL1	33
Summer	10	O	Pied-billed Grebe	POPO1	2
Summer	10	P	Blue-winged Teal	ANDI1	5
Summer	10	P	Cinnamon Teal	ANCY1	2
Summer	10	P	Great Blue Heron	ARHE1	1
Summer	10	P	Mallard	ANPL1	17
Summer	11	P	Great Blue Heron	ARHE1	1
Summer	11	Q	Canada Goose	BRCA1	8
Summer	11	Q	Gadwall	ANST1	2
Summer	11	Q	Great Blue Heron	ARHE1	1

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Summer	11	Q	Mallard	ANPL1	12
Summer	11	Q	Pied-billed Grebe	POPO1	1
Summer	12	L	Blue-winged Teal	ANDI1	3
Summer	12	L	Gadwall	ANST1	2
Summer	12	L	Great Blue Heron	ARHE1	2
Summer	12	L	Mallard	ANPL1	4
Summer	12	N	Blue-winged Teal	ANDI1	5
Summer	12	N	Blue-winged Teal	ANDI1	3
Summer	12	N	Mallard	ANPL1	6
Summer	12	O	American Coot	FUAM1	6
Summer	12	O	Blue-winged Teal	ANDI1	4
Summer	12	O	Canada Goose	BRCA1	6
Summer	12	O	Double-crested Cormorant	PHAU1	5
Summer	12	O	Gadwall	ANST1	3
Summer	12	O	Great Blue Heron	ARHE1	1
Summer	12	O	Mallard	ANPL1	36
Summer	12	O	Pied-billed Grebe	POPO1	4
Summer	12	P	Double-crested Cormorant	PHAU1	2
Summer	12	P	Great Blue Heron	ARHE1	4
Summer	12	P	Mallard	ANPL1	12
Summer	12	P	Pied-billed Grebe	POPO1	1
Summer	12	Q	Blue-winged Teal	ANDI1	1
Summer	12	Q	Canada Goose	BRCA1	9
Summer	12	Q	Double-crested Cormorant	PHAU1	22
Summer	12	Q	Great Blue Heron	ARHE1	3
Summer	12	Q	Mallard	ANPL1	41
Summer	12	Q	Pied-billed Grebe	POPO1	1
Summer	13	H	Blue-winged Teal	ANDI1	5
Summer	13	H	Mallard	ANPL1	7
Summer	13	L	American Coot	FUAM1	11
Summer	13	L	Mallard	ANPL1	1
Summer	13	L	Pied-billed Grebe	POPO1	3
Summer	13	Q	American White Pelican	PEER1	7
Summer	13	Q	Double-crested Cormorant	PHAU1	11
Summer	13	Q	Great Blue Heron	ARHE1	1
Summer	13	Q	Mallard	ANPL1	9
Fall	2	T	American Coot	FUAM1	16
Fall	2	T	American Wigeon	ANAM1	1
Fall	2	T	Blue-winged Teal	ANDI1	37
Fall	2	T	Bufflehead	BUAL1	7
Fall	2	T	Gadwall	ANST1	73
Fall	2	T	Mallard	ANPL1	38
Fall	2	T	Pied-billed Grebe	POPO1	1
Fall	2	T	Ring-necked Duck	AYCO1	14

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Fall	2	U	American Coot	FUAM1	31
Fall	2	U	Bufflehead	BUAL1	4
Fall	2	U	Common Goldeneye	BUCL1	1
Fall	2	U	Gadwall	ANST1	6
Fall	2	U	Green-winged Teal	ANCR1	36
Fall	2	U	Mallard	ANPL1	1
Fall	2	U	Pied-billed Grebe	POPO1	8
Fall	2	U	Ring-necked Duck	AYCO1	8
Fall	2	U	Ruddy Duck	OXJA1	3
Fall	3	R	Bufflehead	BUAL1	23
Fall	3	R	Gadwall	ANST1	2
Fall	3	R	Mallard	ANPL1	20
Fall	3	R	Pied-billed Grebe	POPO1	8
Fall	3	R	Ring-necked Duck	AYCO1	25
Fall	3	S	American Coot	FUAM1	4
Fall	3	S	Blue-winged Teal	ANDI1	1
Fall	3	S	Bufflehead	BUAL1	5
Fall	4	R	American Coot	FUAM1	7
Fall	4	R	American Wigeon	ANAM1	75
Fall	4	R	Gadwall	ANST1	12
Fall	4	R	Great Blue Heron	ARHE1	1
Fall	4	R	Horned Grebe	POAU1	1
Fall	4	R	Mallard	ANPL1	9
Fall	4	R	Pied-billed Grebe	POPO1	7
Fall	4	R	Ring-necked Duck	AYCO1	6
Fall	4	R	Ruddy Duck	OXJA1	3
Fall	4	S	American Coot	FUAM1	2
Fall	7	N	Blue-winged Teal	ANDI1	1
Fall	7	N	Mallard	ANPL1	1
Fall	7	P	Blue-winged Teal	ANDI1	32
Fall	7	P	Bufflehead	BUAL1	9
Fall	7	P	Common Goldeneye	BUCL1	2
Fall	7	P	Green-winged Teal	ANCR1	18
Fall	7	P	Mallard	ANPL1	10
Fall	7	P	Pied-billed Grebe	POPO1	4
Fall	10	O	American Wigeon	ANAM1	5
Fall	10	O	Blue-winged Teal	ANDI1	9
Fall	10	O	Green-winged Teal	ANCR1	9
Fall	10	O	Mallard	ANPL1	51
Fall	10	P	Blue-winged Teal	ANDI1	3
Fall	10	P	Green-winged Teal	ANCR1	4
Fall	10	P	Mallard	ANPL1	1
Fall	11	Q	Blue-winged Teal	ANDI1	2
Fall	11	Q	Bufflehead	BUAL1	3
Fall	12	L	Mallard	ANPL1	3

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Fall	12	L	Pied-billed Grebe	POPO1	1
Fall	12	O	American Wigeon	ANAM1	1
Fall	12	O	Blue-winged Teal	ANDI1	1
Fall	12	O	Gadwall	ANST1	36
Fall	12	O	Green-winged Teal	ANCR1	5
Fall	12	O	Mallard	ANPL1	25
Fall	12	O	Pied-billed Grebe	POPO1	1
Fall	12	P	Bufflehead	BUAL1	6
Fall	12	P	Common Goldeneye	BUCL1	3
Fall	12	P	Mallard	ANPL1	10
Fall	12	P	Pied-billed Grebe	POPO1	1
Fall	12	Q	Blue-winged Teal	ANDI1	6
Fall	12	Q	Bufflehead	BUAL1	38
Fall	12	Q	Mallard	ANPL1	39
Fall	12	Q	Northern Shoveler	ANCL1	1
Fall	13	H	Gadwall	ANST1	2
Fall	13	H	Green-winged Teal	ANCR1	4
Fall	13	H	Mallard	ANPL1	4
Fall	13	L	American Coot	FUAM1	5
Fall	13	L	Mallard	ANPL1	2
Fall	13	Q	Bufflehead	BUAL1	12
Fall	13	Q	Double-crested Cormorant	PHAU1	1
Fall	13	Q	Mallard	ANPL1	1
Winter	2	T	Bufflehead	BUAL1	4
Winter	2	T	Canada Goose	BRCA1	68
Winter	2	T	Common Goldeneye	BUCL1	4
Winter	2	T	Common Merganser	MEME1	1
Winter	2	T	Lesser Scaup	AYAF1	1
Winter	2	T	Mallard	ANPL1	17
Winter	2	T	Ring-necked Duck	AYCO1	21
Winter	2	U	American Coot	FUAM1	2
Winter	2	U	Pied-billed Grebe	POPO1	1
Winter	3	R	Canada Goose	BRCA1	2
Winter	3	R	Cinnamon Teal	ANCY1	1
Winter	3	R	Common Goldeneye	BUCL1	6
Winter	3	R	Common Merganser	MEME1	4
Winter	3	R	Mallard	ANPL1	12
Winter	3	R	Redhead	AYAM1	48
Winter	3	R	Ring-necked Duck	AYCO1	17
Winter	3	S	Mallard	ANPL1	2
Winter	4	R	Common Goldeneye	BUCL1	3
Winter	4	R	Mallard	ANPL1	3
Winter	4	R	Redhead	AYAM1	10
Winter	4	R	Ring-necked Duck	AYCO1	16

Table 3-15. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Winter	7	N	Mallard	ANPL1	3
Winter	7	P	Bufflehead	BUAL1	4
Winter	7	P	Common Goldeneye	BUCL1	9
Winter	7	P	Green-winged Teal	ANCR1	3
Winter	7	P	Mallard	ANPL1	26
Winter	7	P	Redhead	AYAM1	3
Winter	10	O	Green-winged Teal	ANCR1	21
Winter	10	O	Mallard	ANPL1	59
Winter	12	L	Canada Goose	BRCA1	4
Winter	12	L	Mallard	ANPL1	6
Winter	12	O	Common Goldeneye	BUCL1	5
Winter	12	O	Mallard	ANPL1	16
Winter	12	O	Redhead	AYAM1	25
Winter	12	O	Ring-necked Duck	AYCO1	1
Winter	12	P	Bufflehead	BUAL1	1
Winter	12	P	Common Goldeneye	BUCL1	2
Winter	12	P	Mallard	ANPL1	4
Winter	12	Q	Green-winged Teal	ANCR1	10
Winter	12	Q	Mallard	ANPL1	25
Winter	12	Q	Northern Pintail	ANAC1	1
Winter	12	Q	Redhead	AYAM1	1
Winter	13	H	Mallard	ANPL1	3
Winter	13	Q	Bufflehead	BUAL1	2
Winter	13	Q	Common Goldeneye	BUCL1	2
Winter	13	Q	Mallard	ANPL1	10
Winter	13	Q	Redhead	AYAM1	2
Winter	13	U	Mallard	ANPL1	2

Note: RF Grid = grid coordinate; SpecCode = species code

Table 3-16. Raptor relative abundance by season (1995-2000)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Spring	110	Great Horned Owl	BUVI1	11	341	0.0323	12	91.67	1273	0.0094
2000	Spring	230	Great Horned Owl	BUVI1	1	184	0.0054	12	8.33	1273	0.0094
2000	Spring	110	Red-tailed Hawk	BUJA1	5	341	0.0147	7	71.43	1273	0.0055
2000	Spring	230	Red-tailed Hawk	BUJA1	2	184	0.0109	7	28.57	1273	0.0055
2000	Spring	30	American Kestrel	FASP1	1	120	0.0083	6	16.67	1273	0.0047
2000	Spring	110	American Kestrel	FASP1	4	341	0.0117	6	66.67	1273	0.0047
2000	Spring	323	American Kestrel	FASP1	1	112	0.0089	6	16.67	1273	0.0047
2000	Spring	110	Sharp-shinned Hawk	ACST1	2	341	0.0059	2	100.00	1273	0.0016
2000	Spring	230	Northern Harrier	CICY1	1	184	0.0054	2	50.00	1273	0.0016
2000	Spring	322	Northern Harrier	CICY1	1	146	0.0068	2	50.00	1273	0.0016
2000	Spring	211	Cooper's Hawk	ACCO1	1	28	0.0357	1	100.00	1273	0.0008
2000	Spring	324	Turkey Vulture	CAAU1	1	2	0.5000	1	100.00	1273	0.0008
1999	Spring	110	Great Horned Owl	BUVI1	13	301	0.0432	15	86.67	1302	0.0115
1999	Spring	230	Great Horned Owl	BUVI1	2	147	0.0136	15	13.33	1302	0.0115
1999	Spring	110	Red-tailed Hawk	BUJA1	1	301	0.0033	12	8.33	1302	0.0092
1999	Spring	212	Red-tailed Hawk	BUJA1	5	105	0.0476	12	41.67	1302	0.0092
1999	Spring	230	Red-tailed Hawk	BUJA1	1	147	0.0068	12	8.33	1302	0.0092
1999	Spring	322	Red-tailed Hawk	BUJA1	4	181	0.0221	12	33.33	1302	0.0092
1999	Spring	110	American Kestrel	FASP1	6	301	0.0199	8	75.00	1302	0.0061
1999	Spring	212	American Kestrel	FASP1	1	105	0.0095	8	12.50	1302	0.0061
1999	Spring	323	American Kestrel	FASP1	1	139	0.0072	8	12.50	1302	0.0061
1999	Spring	10	Sharp-shinned Hawk	ACST1	1	37	0.0270	4	25.00	1302	0.0031
1999	Spring	230	Sharp-shinned Hawk	ACST1	2	147	0.0136	4	50.00	1302	0.0031
1999	Spring	322	Sharp-shinned Hawk	ACST1	1	181	0.0055	4	25.00	1302	0.0031
1999	Spring	110	Swainson's Hawk	BUSW1	2	301	0.0066	2	100.00	1302	0.0015
1999	Spring	10	Northern Harrier	CICY1	1	37	0.0270	1	100.00	1302	0.0008
1999	Spring	323	Ferruginous Hawk	BURE1	1	139	0.0072	1	100.00	1302	0.0008
1998	Spring	110	Great Horned Owl	BUVI1	12	337	0.0356	14	85.71	1263	0.0111
1998	Spring	230	Great Horned Owl	BUVI1	2	176	0.0114	14	14.29	1263	0.0111
1998	Spring	20	American Kestrel	FASP1	4	121	0.0331	10	40.00	1263	0.0079
1998	Spring	110	American Kestrel	FASP1	3	337	0.0089	10	30.00	1263	0.0079
1998	Spring	212	American Kestrel	FASP1	2	96	0.0208	10	20.00	1263	0.0079
1998	Spring	322	American Kestrel	FASP1	1	100	0.0100	10	10.00	1263	0.0079

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	Spring	20	Red-tailed Hawk	BUJA1	2	121	0.0165	6	33.33	1263	0.0048
1998	Spring	110	Red-tailed Hawk	BUJA1	3	337	0.0089	6	50.00	1263	0.0048
1998	Spring	322	Red-tailed Hawk	BUJA1	1	100	0.0100	6	16.67	1263	0.0048
1998	Spring	110	Swainson's Hawk	BUSW1	2	337	0.0059	2	100.00	1263	0.0016
1998	Spring	230	Turkey Vulture	CAAU1	1	176	0.0057	1	100.00	1263	0.0008
1998	Spring	323	Ferruginous Hawk	BURE1	1	134	0.0075	1	100.00	1263	0.0008
1997	Spring	110	Great Horned Owl	BUVI1	12	411	0.0292	15	80.00	1580	0.0095
1997	Spring	230	Great Horned Owl	BUVI1	3	208	0.0144	15	20.00	1580	0.0095
1997	Spring	110	Red-tailed Hawk	BUJA1	2	411	0.0049	7	28.57	1580	0.0044
1997	Spring	230	Red-tailed Hawk	BUJA1	1	208	0.0048	7	14.29	1580	0.0044
1997	Spring	322	Red-tailed Hawk	BUJA1	4	79	0.0506	7	57.14	1580	0.0044
1997	Spring	30	American Kestrel	FASP1	3	99	0.0303	4	75.00	1580	0.0025
1997	Spring	212	American Kestrel	FASP1	1	138	0.0072	4	25.00	1580	0.0025
1997	Spring	110	Swainson's Hawk	BUSW1	2	411	0.0049	2	100.00	1580	0.0013
1997	Spring	110	Long-eared Owl	ASOT1	1	411	0.0024	1	100.00	1580	0.0006
1996	Spring	110	Great Horned Owl	BUVI1	15	304	0.0493	17	88.24	1726	0.0098
1996	Spring	120	Great Horned Owl	BUVI1	2	2	1.0000	17	11.76	1726	0.0098
1996	Spring	20	Red-tailed Hawk	BUJA1	2	132	0.0152	15	13.33	1726	0.0087
1996	Spring	110	Red-tailed Hawk	BUJA1	8	304	0.0263	15	53.33	1726	0.0087
1996	Spring	212	Red-tailed Hawk	BUJA1	2	143	0.0140	15	13.33	1726	0.0087
1996	Spring	322	Red-tailed Hawk	BUJA1	3	225	0.0133	15	20.00	1726	0.0087
1996	Spring	20	American Kestrel	FASP1	1	132	0.0076	5	20.00	1726	0.0029
1996	Spring	110	American Kestrel	FASP1	2	304	0.0066	5	40.00	1726	0.0029
1996	Spring	322	American Kestrel	FASP1	1	225	0.0044	5	20.00	1726	0.0029
1996	Spring	323	American Kestrel	FASP1	1	145	0.0069	5	20.00	1726	0.0029
1996	Spring	110	Swainson's Hawk	BUSW1	1	304	0.0033	2	50.00	1726	0.0012
1996	Spring	323	Swainson's Hawk	BUSW1	1	145	0.0069	2	50.00	1726	0.0012
1996	Spring	110	Ferruginous Hawk	BURE1	1	304	0.0033	1	100.00	1726	0.0006
1996	Spring	230	Turkey Vulture	CAAU1	1	174	0.0057	1	100.00	1726	0.0006
1996	Spring	230	Northern Harrier	CICY1	1	174	0.0057	1	100.00	1726	0.0006

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	Spring	20	Red-tailed Hawk	BUJA1	1	90	0.0111	13	7.69	1786	0.0073
1995	Spring	110	Red-tailed Hawk	BUJA1	4	381	0.0105	13	30.77	1786	0.0073
1995	Spring	322	Red-tailed Hawk	BUJA1	5	284	0.0176	13	38.46	1786	0.0073
1995	Spring	510	Red-tailed Hawk	BUJA1	2	5	0.4000	13	15.38	1786	0.0073
1995	Spring	540	Red-tailed Hawk	BUJA1	1	24	0.0417	13	7.69	1786	0.0073
1995	Spring	110	Great Horned Owl	BUVI1	6	381	0.0157	7	85.71	1786	0.0039
1995	Spring	120	Great Horned Owl	BUVI1	1	12	0.0833	7	14.29	1786	0.0039
1995	Spring	110	American Kestrel	FASP1	3	381	0.0079	5	60.00	1786	0.0028
1995	Spring	230	American Kestrel	FASP1	1	175	0.0057	5	20.00	1786	0.0028
1995	Spring	322	American Kestrel	FASP1	1	284	0.0035	5	20.00	1786	0.0028
1995	Spring	110	Swainson's Hawk	BUSW1	1	381	0.0026	3	33.33	1786	0.0017
1995	Spring	110	Northern Harrier	CICY1	1	381	0.0026	3	33.33	1786	0.0017
1995	Spring	211	Northern Harrier	CICY1	1	55	0.0182	3	33.33	1786	0.0017
1995	Spring	212	Northern Harrier	CICY1	1	167	0.0060	3	33.33	1786	0.0017
1995	Spring	322	Golden Eagle	AQCH1	3	284	0.0106	3	100.00	1786	0.0017
1995	Spring	322	Swainson's Hawk	BUSW1	2	284	0.0070	3	66.67	1786	0.0017
1995	Spring	110	Sharp-shinned Hawk	ACST1	1	381	0.0026	2	50.00	1786	0.0011
1995	Spring	324	Sharp-shinned Hawk	ACST1	1	31	0.0323	2	50.00	1786	0.0011
1995	Spring	30	Peregrine Falcon	FAPE1	1	163	0.0061	1	100.00	1786	0.0006
1995	Spring	110	Long-eared Owl	ASOT1	1	381	0.0026	1	100.00	1786	0.0006
1995	Spring	322	Northern Goshawk	ACGE1	1	284	0.0035	1	100.00	1786	0.0006
1995	Spring	322	Burrowing Owl	ATCU1	1	284	0.0035	1	100.00	1786	0.0006
2000	Summer	110	American Kestrel	FASP1	1	338	0.0030	9	11.11	1296	0.0069
2000	Summer	212	American Kestrel	FASP1	4	82	0.0488	9	44.44	1296	0.0069
2000	Summer	322	American Kestrel	FASP1	3	145	0.0207	9	33.33	1296	0.0069
2000	Summer	323	American Kestrel	FASP1	1	121	0.0083	9	11.11	1296	0.0069
2000	Summer	110	Great Horned Owl	BUVI1	6	338	0.0178	7	85.71	1296	0.0054
2000	Summer	230	Great Horned Owl	BUVI1	1	199	0.0050	7	14.29	1296	0.0054
2000	Summer	30	Northern Harrier	CICY1	2	112	0.0179	3	66.67	1296	0.0023
2000	Summer	110	Red-tailed Hawk	BUJA1	1	338	0.0030	3	33.33	1296	0.0023
2000	Summer	322	Red-tailed Hawk	BUJA1	1	145	0.0069	3	33.33	1296	0.0023
2000	Summer	323	Red-tailed Hawk	BUJA1	1	121	0.0083	3	33.33	1296	0.0023
2000	Summer	323	Northern Harrier	CICY1	1	121	0.0083	3	33.33	1296	0.0023
2000	Summer	110	Short-eared Owl	ASFL1	2	338	0.0059	2	100.00	1296	0.0015
2000	Summer	110	Swainson's Hawk	BUSW1	1	338	0.0030	1	100.00	1296	0.0008

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Summer	212	Merlin	FACO1	1	82	0.0122	1	100.00	1296	0.0008
2000	Summer	230	Cooper's Hawk	ACCO1	1	199	0.0050	1	100.00	1296	0.0008
2000	Summer	230	Northern Goshawk	ACGE1	1	199	0.0050	1	100.00	1296	0.0008
1999	Summer	110	Great Horned Owl	BUVI1	7	411	0.0170	9	77.78	1547	0.0058
1999	Summer	212	Great Horned Owl	BUVI1	1	124	0.0081	9	11.11	1547	0.0058
1999	Summer	230	Great Horned Owl	BUVI1	1	202	0.0050	9	11.11	1547	0.0058
1999	Summer	20	Northern Harrier	CICY1	1	98	0.0102	8	12.50	1547	0.0052
1999	Summer	110	Northern Harrier	CICY1	1	411	0.0024	8	12.50	1547	0.0052
1999	Summer	230	Northern Harrier	CICY1	1	202	0.0050	8	12.50	1547	0.0052
1999	Summer	322	Northern Harrier	CICY1	3	159	0.0189	8	37.50	1547	0.0052
1999	Summer	323	Northern Harrier	CICY1	2	159	0.0126	8	25.00	1547	0.0052
1999	Summer	30	American Kestrel	FASP1	2	109	0.0183	7	28.57	1547	0.0045
1999	Summer	110	American Kestrel	FASP1	2	411	0.0049	7	28.57	1547	0.0045
1999	Summer	212	American Kestrel	FASP1	2	124	0.0161	7	28.57	1547	0.0045
1999	Summer	322	American Kestrel	FASP1	1	159	0.0063	7	14.29	1547	0.0045
1999	Summer	110	Red-tailed Hawk	BUJA1	2	411	0.0049	6	33.33	1547	0.0039
1999	Summer	110	Swainson's Hawk	BUSW1	4	411	0.0097	6	66.67	1547	0.0039
1999	Summer	230	Red-tailed Hawk	BUJA1	1	202	0.0050	6	16.67	1547	0.0039
1999	Summer	322	Red-tailed Hawk	BUJA1	3	159	0.0189	6	50.00	1547	0.0039
1999	Summer	322	Swainson's Hawk	BUSW1	1	159	0.0063	6	16.67	1547	0.0039
1999	Summer	324	Swainson's Hawk	BUSW1	1	23	0.0435	6	16.67	1547	0.0039
1999	Summer	230	Turkey Vulture	CAAU1	1	202	0.0050	2	50.00	1547	0.0013
1999	Summer	322	Turkey Vulture	CAAU1	1	159	0.0063	2	50.00	1547	0.0013
1998	Summer	110	Swainson's Hawk	BUSW1	10	352	0.0284	10	100.00	1339	0.0075
1998	Summer	110	American Kestrel	FASP1	5	352	0.0142	8	62.50	1339	0.0060
1998	Summer	212	American Kestrel	FASP1	1	79	0.0127	8	12.50	1339	0.0060
1998	Summer	323	American Kestrel	FASP1	2	170	0.0118	8	25.00	1339	0.0060
1998	Summer	30	Red-tailed Hawk	BUJA1	1	111	0.0090	5	20.00	1339	0.0037
1998	Summer	110	Red-tailed Hawk	BUJA1	4	352	0.0114	5	80.00	1339	0.0037
1998	Summer	110	Great Horned Owl	BUVI1	4	352	0.0114	5	80.00	1339	0.0037
1998	Summer	230	Great Horned Owl	BUVI1	1	192	0.0052	5	20.00	1339	0.0037
1998	Summer	30	Northern Harrier	CICY1	1	111	0.0090	3	33.33	1339	0.0022
1998	Summer	230	Northern Harrier	CICY1	1	192	0.0052	3	33.33	1339	0.0022
1998	Summer	323	Northern Harrier	CICY1	1	170	0.0059	3	33.33	1339	0.0022
1998	Summer	323	Golden Eagle	AQCH1	1	170	0.0059	1	100.00	1339	0.0007

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	Summer	10	Swainson's Hawk	BUSW1	1	75	0.0133	9	11.11	1361	0.0066
1997	Summer	30	Swainson's Hawk	BUSW1	1	129	0.0078	9	11.11	1361	0.0066
1997	Summer	110	Swainson's Hawk	BUSW1	7	327	0.0214	9	77.78	1361	0.0066
1997	Summer	10	American Kestrel	FASP1	1	75	0.0133	7	14.29	1361	0.0051
1997	Summer	110	American Kestrel	FASP1	4	327	0.0122	7	57.14	1361	0.0051
1997	Summer	230	American Kestrel	FASP1	1	212	0.0047	7	14.29	1361	0.0051
1997	Summer	322	American Kestrel	FASP1	1	77	0.0130	7	14.29	1361	0.0051
1997	Summer	110	Great Horned Owl	BUVI1	5	327	0.0153	6	83.33	1361	0.0044
1997	Summer	230	Great Horned Owl	BUVI1	1	212	0.0047	6	16.67	1361	0.0044
1997	Summer	30	Turkey Vulture	CAAU1	1	129	0.0078	1	100.00	1361	0.0007
1997	Summer	322	Red-tailed Hawk	BUJA1	1	77	0.0130	1	100.00	1361	0.0007
1996	Summer	10	Red-tailed Hawk	BUJA1	1	79	0.0127	16	6.25	1609	0.0099
1996	Summer	110	Red-tailed Hawk	BUJA1	9	451	0.0200	16	56.25	1609	0.0099
1996	Summer	211	Red-tailed Hawk	BUJA1	1	66	0.0152	16	6.25	1609	0.0099
1996	Summer	322	Red-tailed Hawk	BUJA1	3	119	0.0252	16	18.75	1609	0.0099
1996	Summer	323	Red-tailed Hawk	BUJA1	2	210	0.0095	16	12.50	1609	0.0099
1996	Summer	110	Great Horned Owl	BUVI1	9	451	0.0200	12	75.00	1609	0.0075
1996	Summer	212	Great Horned Owl	BUVI1	1	118	0.0085	12	8.33	1609	0.0075
1996	Summer	230	Great Horned Owl	BUVI1	2	186	0.0108	12	16.67	1609	0.0075
1996	Summer	110	American Kestrel	FASP1	1	451	0.0022	5	20.00	1609	0.0031
1996	Summer	322	American Kestrel	FASP1	2	119	0.0168	5	40.00	1609	0.0031
1996	Summer	323	American Kestrel	FASP1	2	210	0.0095	5	40.00	1609	0.0031
1996	Summer	54	Swainson's Hawk	BUSW1	1	85	0.0118	4	25.00	1609	0.0025
1996	Summer	110	Swainson's Hawk	BUSW1	3	451	0.0067	4	75.00	1609	0.0025
1996	Summer	110	Northern Goshawk	ACGE1	1	451	0.0022	1	100.00	1609	0.0006
1995	Summer	110	Swainson's Hawk	BUSW1	3	312	0.0096	4	75.00	2269	0.0018
1995	Summer	510	Swainson's Hawk	BUSW1	1	7	0.1429	4	25.00	2269	0.0018
1995	Summer	30	Red-tailed Hawk	BUJA1	1	109	0.0092	3	33.33	2269	0.0013
1995	Summer	110	Red-tailed Hawk	BUJA1	1	312	0.0032	3	33.33	2269	0.0013
1995	Summer	212	Red-tailed Hawk	BUJA1	1	753	0.0013	3	33.33	2269	0.0013
1995	Summer	20	Northern Harrier	CICY1	1	102	0.0098	2	50.00	2269	0.0009
1995	Summer	230	Northern Harrier	CICY1	1	288	0.0035	2	50.00	2269	0.0009
1995	Summer	110	Great Horned Owl	BUVI1	1	312	0.0032	1	100.00	2269	0.0004

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Fall	10	Northern Harrier	CICY1	1	16	0.0625	5	20.00	1132	0.0044
2000	Fall	30	Northern Harrier	CICY1	2	87	0.0230	5	40.00	1132	0.0044
2000	Fall	110	Great Horned Owl	BUVI1	5	269	0.0186	5	100.00	1132	0.0044
2000	Fall	230	Northern Harrier	CICY1	1	169	0.0059	5	20.00	1132	0.0044
2000	Fall	322	Northern Harrier	CICY1	1	128	0.0078	5	20.00	1132	0.0044
2000	Fall	30	Rough-legged Hawk	BULA1	1	87	0.0115	3	33.33	1132	0.0027
2000	Fall	110	Rough-legged Hawk	BULA1	1	269	0.0037	3	33.33	1132	0.0027
2000	Fall	110	American Kestrel	FASP1	2	269	0.0074	3	66.67	1132	0.0027
2000	Fall	230	Rough-legged Hawk	BULA1	1	169	0.0059	3	33.33	1132	0.0027
2000	Fall	322	American Kestrel	FASP1	1	128	0.0078	3	33.33	1132	0.0027
2000	Fall	110	Red-tailed Hawk	BUJA1	1	269	0.0037	2	50.00	1132	0.0018
2000	Fall	323	Red-tailed Hawk	BUJA1	1	117	0.0085	2	50.00	1132	0.0018
2000	Fall	110	Merlin	FACO1	1	269	0.0037	1	100.00	1132	0.0009
2000	Fall	230	Long-eared Owl	ASOT1	1	169	0.0059	1	100.00	1132	0.0009
2000	Fall	323	Golden Eagle	AQCH1	1	117	0.0085	1	100.00	1132	0.0009
1999	Fall	20	American Kestrel	FASP1	2	87	0.0230	14	14.29	1356	0.0103
1999	Fall	30	American Kestrel	FASP1	1	125	0.0080	14	7.14	1356	0.0103
1999	Fall	110	American Kestrel	FASP1	7	323	0.0217	14	50.00	1356	0.0103
1999	Fall	212	American Kestrel	FASP1	1	164	0.0061	14	7.14	1356	0.0103
1999	Fall	322	American Kestrel	FASP1	2	133	0.0150	14	14.29	1356	0.0103
1999	Fall	323	American Kestrel	FASP1	1	129	0.0078	14	7.14	1356	0.0103
1999	Fall	110	Great Horned Owl	BUVI1	8	323	0.0248	9	88.89	1356	0.0066
1999	Fall	212	Great Horned Owl	BUVI1	1	164	0.0061	9	11.11	1356	0.0066
1999	Fall	30	Northern Harrier	CICY1	1	125	0.0080	4	25.00	1356	0.0029
1999	Fall	54	Northern Harrier	CICY1	1	113	0.0088	4	25.00	1356	0.0029
1999	Fall	110	Red-tailed Hawk	BUJA1	1	323	0.0031	4	25.00	1356	0.0029
1999	Fall	212	Red-tailed Hawk	BUJA1	1	164	0.0061	4	25.00	1356	0.0029
1999	Fall	230	Northern Harrier	CICY1	2	186	0.0108	4	50.00	1356	0.0029
1999	Fall	322	Red-tailed Hawk	BUJA1	2	133	0.0150	4	50.00	1356	0.0029
1999	Fall	230	Rough-legged Hawk	BULA1	1	186	0.0054	2	50.00	1356	0.0015
1999	Fall	322	Rough-legged Hawk	BULA1	1	133	0.0075	2	50.00	1356	0.0015
1999	Fall	20	Golden Eagle	AQCH1	1	87	0.0115	1	100.00	1356	0.0007

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	Fall	110	American Kestrel	FASP1	2	310	0.0065	9	22.22	1210	0.0074
1998	Fall	212	American Kestrel	FASP1	4	93	0.0430	9	44.44	1210	0.0074
1998	Fall	322	American Kestrel	FASP1	1	90	0.0111	9	11.11	1210	0.0074
1998	Fall	323	American Kestrel	FASP1	2	138	0.0145	9	22.22	1210	0.0074
1998	Fall	20	Northern Harrier	CICY1	1	88	0.0114	8	12.50	1210	0.0066
1998	Fall	30	Northern Harrier	CICY1	2	90	0.0222	8	25.00	1210	0.0066
1998	Fall	212	Northern Harrier	CICY1	3	93	0.0323	8	37.50	1210	0.0066
1998	Fall	230	Northern Harrier	CICY1	1	164	0.0061	8	12.50	1210	0.0066
1998	Fall	323	Northern Harrier	CICY1	1	138	0.0072	8	12.50	1210	0.0066
1998	Fall	110	Great Horned Owl	BUVI1	6	310	0.0194	7	85.71	1210	0.0058
1998	Fall	230	Great Horned Owl	BUVI1	1	164	0.0061	7	14.29	1210	0.0058
1998	Fall	110	Red-tailed Hawk	BUJA1	1	310	0.0032	5	20.00	1210	0.0041
1998	Fall	212	Red-tailed Hawk	BUJA1	3	93	0.0323	5	60.00	1210	0.0041
1998	Fall	230	Red-tailed Hawk	BUJA1	1	164	0.0061	5	20.00	1210	0.0041
1998	Fall	212	Rough-legged Hawk	BULA1	1	93	0.0108	3	33.33	1210	0.0025
1998	Fall	230	Rough-legged Hawk	BULA1	2	164	0.0122	3	66.67	1210	0.0025
1998	Fall	110	Barn Owl	TYAL1	1	310	0.0032	1	100.00	1210	0.0008
1997	Fall	110	Great Horned Owl	BUVI1	7	313	0.0224	9	77.78	1221	0.0074
1997	Fall	520	Great Horned Owl	BUVI1	2	1	2.0000	9	22.22	1221	0.0074
1997	Fall	54	Red-tailed Hawk	BUJA1	1	82	0.0122	5	20.00	1221	0.0041
1997	Fall	110	Red-tailed Hawk	BUJA1	2	313	0.0064	5	40.00	1221	0.0041
1997	Fall	323	Red-tailed Hawk	BUJA1	2	161	0.0124	5	40.00	1221	0.0041
1997	Fall	110	American Kestrel	FASP1	4	313	0.0128	4	100.00	1221	0.0033
1997	Fall	20	Prairie Falcon	FAME1	1	95	0.0105	2	50.00	1221	0.0016
1997	Fall	110	Prairie Falcon	FAME1	1	313	0.0032	2	50.00	1221	0.0016
1997	Fall	110	Cooper's Hawk	ACCO1	1	313	0.0032	1	100.00	1221	0.0008
1997	Fall	230	Northern Harrier	CICY1	1	182	0.0055	1	100.00	1221	0.0008
1996	Fall	110	Great Horned Owl	BUVI1	12	300	0.0400	13	92.31	1418	0.0092
1996	Fall	230	Great Horned Owl	BUVI1	1	196	0.0051	13	7.69	1418	0.0092
1996	Fall	93	Red-tailed Hawk	BUJA1	1	4	0.2500	6	16.67	1418	0.0042
1996	Fall	212	Red-tailed Hawk	BUJA1	1	101	0.0099	6	16.67	1418	0.0042
1996	Fall	230	Blue Jay	CYCR1	6	196	0.0306	6	100.00	1418	0.0042
1996	Fall	230	Red-tailed Hawk	BUJA1	1	196	0.0051	6	16.67	1418	0.0042
1996	Fall	322	Red-tailed Hawk	BUJA1	1	105	0.0095	6	16.67	1418	0.0042
1996	Fall	323	Red-tailed Hawk	BUJA1	2	148	0.0135	6	33.33	1418	0.0042

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	Fall	30	American Kestrel	FASP1	1	95	0.0105	4	25.00	1418	0.0028
1996	Fall	110	American Kestrel	FASP1	2	300	0.0067	4	50.00	1418	0.0028
1996	Fall	322	American Kestrel	FASP1	1	105	0.0095	4	25.00	1418	0.0028
1996	Fall	10	Northern Harrier	CICY1	2	64	0.0313	3	66.67	1418	0.0021
1996	Fall	212	Northern Harrier	CICY1	1	101	0.0099	3	33.33	1418	0.0021
1996	Fall	323	Turkey Vulture	CAAU1	2	148	0.0135	2	100.00	1418	0.0014
1996	Fall	110	Golden Eagle	AQCH1	1	300	0.0033	1	100.00	1418	0.0007
1996	Fall	110	Cooper's Hawk	ACCO1	1	300	0.0033	1	100.00	1418	0.0007
1995	Fall	110	Great Horned Owl	BUVI1	11	373	0.0295	11	100	1837	0.0060
1995	Fall	10	Red-tailed Hawk	BUJA1	1	44	0.0227	9	11.11111	1837	0.0049
1995	Fall	54	Red-tailed Hawk	BUJA1	1	134	0.0075	9	11.11111	1837	0.0049
1995	Fall	110	Red-tailed Hawk	BUJA1	3	373	0.0080	9	33.33333	1837	0.0049
1995	Fall	212	Red-tailed Hawk	BUJA1	2	200	0.0100	9	22.22222	1837	0.0049
1995	Fall	230	Red-tailed Hawk	BUJA1	1	220	0.0045	9	11.11111	1837	0.0049
1995	Fall	322	Red-tailed Hawk	BUJA1	1	327	0.0031	9	11.11111	1837	0.0049
1995	Fall	10	Northern Harrier	CICY1	1	44	0.0227	7	14.28571	1837	0.0038
1995	Fall	54	Northern Harrier	CICY1	2	134	0.0149	7	28.57143	1837	0.0038
1995	Fall	110	Northern Harrier	CICY1	1	373	0.0027	7	14.28571	1837	0.0038
1995	Fall	211	Northern Harrier	CICY1	1	102	0.0098	7	14.28571	1837	0.0038
1995	Fall	212	Northern Harrier	CICY1	1	200	0.0050	7	14.28571	1837	0.0038
1995	Fall	530	Northern Harrier	CICY1	1	131	0.0076	7	14.28571	1837	0.0038
1995	Fall	110	American Kestrel	FASP1	2	373	0.0054	3	66.66667	1837	0.0016
1995	Fall	322	American Kestrel	FASP1	1	327	0.0031	3	33.33333	1837	0.0016
1995	Fall	110	Rough-legged Hawk	BULA1	1	373	0.0027	2	50	1837	0.0011
1995	Fall	230	Rough-legged Hawk	BULA1	1	220	0.0045	2	50	1837	0.0011
1995	Fall	322	Prairie Falcon	FAME1	2	327	0.0061	2	100	1837	0.0011
1995	Fall	110	Cooper's Hawk	ACCO1	1	373	0.0027	1	100	1837	0.0005
1995	Fall	211	Bald Eagle	HALE1	1	102	0.0098	1	100	1837	0.0005
1995	Fall	322	Golden Eagle	AQCH1	1	327	0.0031	1	100	1837	0.0005

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Winter	110	Great Horned Owl	BUVI1	11	311	0.0354	11	100.00	1081	0.0102
2000	Winter	212	American Kestrel	FASP1	1	68	0.0147	2	50.00	1081	0.0019
2000	Winter	322	American Kestrel	FASP1	1	157	0.0064	2	50.00	1081	0.0019
2000	Winter	30	Northern Harrier	CICY1	1	101	0.0099	1	100.00	1081	0.0009
2000	Winter	110	Prairie Falcon	FAME1	1	311	0.0032	1	100.00	1081	0.0009
2000	Winter	230	Golden Eagle	AQCH1	1	134	0.0075	1	100.00	1081	0.0009
1999	Winter	110	Great Horned Owl	BUVI1	14	263	0.0532	16	87.50	1053	0.0152
1999	Winter	230	Great Horned Owl	BUVI1	2	136	0.0147	16	12.50	1053	0.0152
1999	Winter	20	American Kestrel	FASP1	1	93	0.0108	10	10.00	1053	0.0095
1999	Winter	211	American Kestrel	FASP1	2	28	0.0714	10	20.00	1053	0.0095
1999	Winter	212	American Kestrel	FASP1	3	63	0.0476	10	30.00	1053	0.0095
1999	Winter	322	American Kestrel	FASP1	3	152	0.0197	10	30.00	1053	0.0095
1999	Winter	323	American Kestrel	FASP1	1	127	0.0079	10	10.00	1053	0.0095
1999	Winter	20	Red-tailed Hawk	BUJA1	1	93	0.0108	3	33.33	1053	0.0028
1999	Winter	110	Red-tailed Hawk	BUJA1	1	263	0.0038	3	33.33	1053	0.0028
1999	Winter	323	Red-tailed Hawk	BUJA1	1	127	0.0079	3	33.33	1053	0.0028
1999	Winter	322	Prairie Falcon	FAME1	2	152	0.0132	2	100.00	1053	0.0019
1999	Winter	323	Rough-legged Hawk	BULA1	2	127	0.0157	2	100.00	1053	0.0019
1999	Winter	20	Northern Harrier	CICY1	1	93	0.0108	1	100.00	1053	0.0009
1999	Winter	322	Golden Eagle	AQCH1	1	152	0.0066	1	100.00	1053	0.0009
1998	Winter	110	Great Horned Owl	BUVI1	17	300	0.0567	18	94.44	1092	0.0165
1998	Winter	130	Great Horned Owl	BUVI1	1	15	0.0667	18	5.56	1092	0.0165
1998	Winter	30	American Kestrel	FASP1	1	49	0.0204	5	20.00	1092	0.0046
1998	Winter	110	American Kestrel	FASP1	2	300	0.0067	5	40.00	1092	0.0046
1998	Winter	322	American Kestrel	FASP1	2	93	0.0215	5	40.00	1092	0.0046
1998	Winter	20	Rough-legged Hawk	BULA1	1	126	0.0079	4	25.00	1092	0.0037
1998	Winter	110	Rough-legged Hawk	BULA1	1	300	0.0033	4	25.00	1092	0.0037
1998	Winter	322	Rough-legged Hawk	BULA1	1	93	0.0108	4	25.00	1092	0.0037
1998	Winter	323	Rough-legged Hawk	BULA1	1	114	0.0088	4	25.00	1092	0.0037
1998	Winter	110	Red-tailed Hawk	BUJA1	1	300	0.0033	3	33.33	1092	0.0027
1998	Winter	212	Red-tailed Hawk	BUJA1	2	94	0.0213	3	66.67	1092	0.0027
1998	Winter	110	Northern Harrier	CICY1	1	300	0.0033	2	50.00	1092	0.0018
1998	Winter	230	Northern Harrier	CICY1	1	137	0.0073	2	50.00	1092	0.0018
1998	Winter	230	Short-eared Owl	ASFL1	1	137	0.0073	1	100.00	1092	0.0009
1998	Winter	322	Golden Eagle	AQCH1	1	93	0.0108	1	100.00	1092	0.0009

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	Winter	110	Great Horned Owl	BUVI1	14	310	0.0452	15	93.33	1112	0.0135
1997	Winter	212	Great Horned Owl	BUVI1	1	73	0.0137	15	6.67	1112	0.0135
1997	Winter	20	American Kestrel	FASP1	1	127	0.0079	2	50.00	1112	0.0018
1997	Winter	110	American Kestrel	FASP1	1	310	0.0032	2	50.00	1112	0.0018
1997	Winter	110	Bald Eagle	HALE1	1	310	0.0032	1	100.00	1112	0.0009
1997	Winter	322	Rough-legged Hawk	BULA1	1	86	0.0116	1	100.00	1112	0.0009
1996	Winter	110	Great Horned Owl	BUVI1	16	275	0.0582	17	94.12	1243	0.0137
1996	Winter	230	Great Horned Owl	BUVI1	1	144	0.0069	17	5.88	1243	0.0137
1996	Winter	20	Rough-legged Hawk	BULA1	2	85	0.0235	5	40.00	1243	0.0040
1996	Winter	110	Rough-legged Hawk	BULA1	2	275	0.0073	5	40.00	1243	0.0040
1996	Winter	323	Rough-legged Hawk	BULA1	1	244	0.0041	5	20.00	1243	0.0040
1996	Winter	30	Red-tailed Hawk	BUJA1	1	81	0.0123	4	25.00	1243	0.0032
1996	Winter	110	Red-tailed Hawk	BUJA1	1	275	0.0036	4	25.00	1243	0.0032
1996	Winter	212	Red-tailed Hawk	BUJA1	2	148	0.0135	4	50.00	1243	0.0032
1996	Winter	230	Golden Eagle	AQCH1	1	144	0.0069	3	33.33	1243	0.0024
1996	Winter	322	Golden Eagle	AQCH1	1	111	0.0090	3	33.33	1243	0.0024
1996	Winter	323	Golden Eagle	AQCH1	1	244	0.0041	3	33.33	1243	0.0024
1996	Winter	110	Northern Harrier	CICY1	1	275	0.0036	2	50.00	1243	0.0016
1996	Winter	322	Northern Harrier	CICY1	1	111	0.0090	2	50.00	1243	0.0016
1996	Winter	322	Prairie Falcon	FAME1	2	111	0.0180	2	100.00	1243	0.0016
1996	Winter	110	Ferruginous Hawk	BURE1	1	275	0.0036	1	100.00	1243	0.0008
1995	Winter	110	Great Horned Owl	BUVI1	19	333	0.0571	22	86.36364	1496	0.0147
1995	Winter	211	Great Horned Owl	BUVI1	1	71	0.0141	22	4.545455	1496	0.0147
1995	Winter	230	Great Horned Owl	BUVI1	1	156	0.0064	22	4.545455	1496	0.0147
1995	Winter	520	Great Horned Owl	BUVI1	1	6	0.1667	22	4.545455	1496	0.0147
1995	Winter	10	Red-tailed Hawk	BUJA1	1	72	0.0139	9	11.11111	1496	0.0060
1995	Winter	10	Northern Harrier	CICY1	2	72	0.0278	9	22.22222	1496	0.0060
1995	Winter	20	Northern Harrier	CICY1	2	133	0.0150	9	22.22222	1496	0.0060
1995	Winter	30	Northern Harrier	CICY1	1	124	0.0081	9	11.11111	1496	0.0060
1995	Winter	110	Red-tailed Hawk	BUJA1	1	333	0.0030	9	11.11111	1496	0.0060
1995	Winter	110	Northern Harrier	CICY1	2	333	0.0060	9	22.22222	1496	0.0060
1995	Winter	211	Red-tailed Hawk	BUJA1	1	71	0.0141	9	11.11111	1496	0.0060
1995	Winter	230	Red-tailed Hawk	BUJA1	1	156	0.0064	9	11.11111	1496	0.0060

Table 3-16. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	Winter	230	Northern Harrier	CICY1	1	156	0.0064	9	11.11111	1496	0.0060
1995	Winter	322	Red-tailed Hawk	BUJA1	1	209	0.0048	9	11.11111	1496	0.0060
1995	Winter	322	Northern Harrier	CICY1	1	209	0.0048	9	11.11111	1496	0.0060
1995	Winter	323	Red-tailed Hawk	BUJA1	2	95	0.0211	9	22.22222	1496	0.0060
1995	Winter	550	Red-tailed Hawk	BUJA1	2	2	1.0000	9	22.22222	1496	0.0060
1995	Winter	110	Rough-legged Hawk	BULA1	2	333	0.0060	2	100	1496	0.0013
1995	Winter	110	American Kestrel	FASP1	1	333	0.0030	2	50	1496	0.0013
1995	Winter	322	Turkey Vulture	CAAU1	2	209	0.0096	2	100	1496	0.0013
1995	Winter	520	American Kestrel	FASP1	1	6	0.1667	2	50	1496	0.0013
1995	Winter	322	Bald Eagle	HALE1	1	209	0.0048	1	100	1496	0.0007

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-17. Seasonal raptor area use (1997-2000)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	2	G	Golden Eagle	AQCH1	1
Spring	2	G	Red-tailed Hawk	BUJA1	1
Spring	2	J	Peregrine Falcon	FAPE1	1
Spring	2	K	Red-tailed Hawk	BUJA1	3
Spring	2	L	American Kestrel	FASP1	1
Spring	2	N	Ferruginous Hawk	BURE1	2
Spring	2	P	Red-tailed Hawk	BUJA1	1
Spring	2	R	American Kestrel	FASP1	1
Spring	2	T	American Kestrel	FASP1	1
Spring	2	U	Red-tailed Hawk	BUJA1	2
Spring	3	K	Red-tailed Hawk	BUJA1	1
Spring	3	M	Red-tailed Hawk	BUJA1	1
Spring	4	H	Northern Harrier	CICY1	1
Spring	4	L	Great Horned Owl	BUVI1	1
Spring	4	L	Red-tailed Hawk	BUJA1	2
Spring	4	M	Great Horned Owl	BUVI1	1
Spring	4	Q	Red-tailed Hawk	BUJA1	1
Spring	4	S	Great Horned Owl	BUVI1	1
Spring	4	U	Red-tailed Hawk	BUJA1	2
Spring	5	P	Red-tailed Hawk	BUJA1	1
Spring	7	G	Red-tailed Hawk	BUJA1	1
Spring	7	H	Red-tailed Hawk	BUJA1	1
Spring	7	I	Great Horned Owl	BUVI1	2
Spring	7	I	Red-tailed Hawk	BUJA1	1
Spring	7	J	Rough-legged Hawk	BULA1	1
Spring	7	M	American Kestrel	FASP1	1
Spring	7	P	Red-tailed Hawk	BUJA1	1
Spring	9	F	Red-tailed Hawk	BUJA1	1
Spring	9	G	American Kestrel	FASP1	1
Spring	9	Q	Northern Harrier	CICY1	1
Spring	10	N	American Kestrel	FASP1	1
Spring	10	P	American Kestrel	FASP1	3
Spring	10	Q	Red-tailed Hawk	BUJA1	2
Spring	10	R	Red-tailed Hawk	BUJA1	1
Spring	11	E	Red-tailed Hawk	BUJA1	1
Spring	11	M	American Kestrel	FASP1	1
Spring	11	M	Great Horned Owl	BUVI1	5
Spring	11	M	Red-tailed Hawk	BUJA1	1
Spring	11	M	Swainson's Hawk	BUSW1	4
Spring	11	M	Turkey Vulture	CAAU1	1
Spring	11	N	American Kestrel	FASP1	1
Spring	12	E	Red-tailed Hawk	BUJA1	1
Spring	12	K	American Kestrel	FASP1	1
Spring	12	L	Red-tailed Hawk	BUJA1	1
Spring	12	M	Swainson's Hawk	BUSW1	3

Table 3-17. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	12	N	Sharp-shinned Hawk	ACST1	1
Spring	12	N	Swainson's Hawk	BUSW1	1
Spring	12	Q	Red-tailed Hawk	BUJA1	1
Spring	12	Q	Swainson's Hawk	BUSW1	1
Spring	13	F	American Kestrel	FASP1	1
Spring	13	G	American Kestrel	FASP1	5
Spring	13	N	Red-tailed Hawk	BUJA1	2
Spring	13	P	Red-tailed Hawk	BUJA1	1
Spring	13	S	Great Horned Owl	BUVI1	1
Spring	14	G	Golden Eagle	AQCH1	1
Spring	15	J	Great Horned Owl	BUVI1	1
Spring	15	P	Prairie Falcon	FAME1	1
Spring	16	J	Red-tailed Hawk	BUJA1	2
Spring	16	K	Red-tailed Hawk	BUJA1	1
Spring	16	K	Swainson's Hawk	BUSW1	2
Spring	16	L	Red-tailed Hawk	BUJA1	1
Spring	E	A	Bald Eagle	HALE1	1
Summer	2	F	Red-tailed Hawk	BUJA1	1
Summer	2	J	American Kestrel	FASP1	2
Summer	2	J	Red-tailed Hawk	BUJA1	1
Summer	2	L	American Kestrel	FASP1	1
Summer	2	L	Red-tailed Hawk	BUJA1	1
Summer	2	N	Burrowing Owl	ATCU1	5
Summer	2	O	Great Horned Owl	BUVI1	1
Summer	2	O	Red-tailed Hawk	BUJA1	1
Summer	2	R	American Kestrel	FASP1	2
Summer	3	G	Red-tailed Hawk	BUJA1	1
Summer	3	M	American Kestrel	FASP1	1
Summer	3	N	Red-tailed Hawk	BUJA1	1
Summer	3	T	Northern Harrier	CICY1	1
Summer	4	I	Northern Harrier	CICY1	1
Summer	4	L	Red-tailed Hawk	BUJA1	1
Summer	4	S	Northern Harrier	CICY1	1
Summer	5	F	American Kestrel	FASP1	1
Summer	5	I	Northern Harrier	CICY1	1
Summer	5	P	American Kestrel	FASP1	1
Summer	5	P	Cooper's Hawk	ACCO1	1
Summer	5	R	Great Horned Owl	BUVI1	1
Summer	5	S	Red-tailed Hawk	BUJA1	1
Summer	6	Q	Red-tailed Hawk	BUJA1	1
Summer	7	I	American Kestrel	FASP1	1
Summer	7	I	Red-tailed Hawk	BUJA1	1
Summer	7	L	Turkey Vulture	CAAU1	1
Summer	7	M	Swainson's Hawk	BUSW1	3

Table 3-17. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Summer	7	N	Turkey Vulture	CAAU1	1
Summer	7	O	American Kestrel	FASP1	1
Summer	7	O	Great Horned Owl	BUVI1	1
Summer	7	P	Red-tailed Hawk	BUJA1	1
Summer	8	F	American Kestrel	FASP1	1
Summer	8	O	Red-tailed Hawk	BUJA1	1
Summer	10	G	Red-tailed Hawk	BUJA1	1
Summer	10	O	Red-tailed Hawk	BUJA1	1
Summer	10	P	American Kestrel	FASP1	1
Summer	10	Q	Swainson's Hawk	BUSW1	3
Summer	11	J	American Kestrel	FASP1	1
Summer	11	L	Swainson's Hawk	BUSW1	1
Summer	11	M	Swainson's Hawk	BUSW1	9
Summer	11	P	American Kestrel	FASP1	1
Summer	11	P	American Kestrel	FASP1	2
Summer	12	K	American Kestrel	FASP1	2
Summer	12	M	Swainson's Hawk	BUSW1	2
Summer	12	O	American Kestrel	FASP1	1
Summer	12	P	Swainson's Hawk	BUSW1	1
Summer	12	Q	American Kestrel	FASP1	2
Summer	12	Q	Red-tailed Hawk	BUJA1	1
Summer	13	G	American Kestrel	FASP1	2
Summer	13	G	Great Horned Owl	BUVI1	1
Summer	13	H	American Kestrel	FASP1	1
Summer	13	H	Great Horned Owl	BUVI1	2
Summer	13	K	Red-tailed Hawk	BUJA1	1
Summer	13	L	Swainson's Hawk	BUSW1	1
Summer	14	F	Red-tailed Hawk	BUJA1	3
Summer	14	H	Northern Harrier	CICY1	1
Summer	14	H	Peregrine Falcon	FAPE1	1
Summer	14	J	Great Horned Owl	BUVI1	2
Summer	14	J	Northern Harrier	CICY1	1
Summer	14	N	Rough-legged Hawk	BULA1	1
Summer	15	J	Northern Harrier	CICY1	1
Summer	15	J	Red-tailed Hawk	BUJA1	1
Summer	15	Q	Great Horned Owl	BUVI1	1
Summer	16	L	Red-tailed Hawk	BUJA1	1
Fall	2	F	American Kestrel	FASP1	1
Fall	2	J	American Kestrel	FASP1	1
Fall	2	J	Red-tailed Hawk	BUJA1	1
Fall	2	L	Red-tailed Hawk	BUJA1	1
Fall	2	O	Long-eared Owl	ASOT1	1
Fall	2	O	Northern Harrier	CICY1	1
Fall	2	O	Red-tailed Hawk	BUJA1	2

Table 3-17. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Fall	2	R	Golden Eagle	AQCH1	2
Fall	2	U	Rough-legged Hawk	BULA1	1
Fall	3	F	American Kestrel	FASP1	2
Fall	3	L	Red-tailed Hawk	BUJA1	1
Fall	3	M	Red-tailed Hawk	BUJA1	1
Fall	3	R	Red-tailed Hawk	BUJA1	1
Fall	3	S	Great Horned Owl	BUVI1	1
Fall	3	S	Red-tailed Hawk	BUJA1	1
Fall	3	T	Great Horned Owl	BUVI1	1
Fall	4	F	American Kestrel	FASP1	3
Fall	4	M	Red-tailed Hawk	BUJA1	1
Fall	4	R	Osprey	PAHA1	1
Fall	5	J	American Kestrel	FASP1	3
Fall	6	F	American Kestrel	FASP1	1
Fall	6	F	Prairie Falcon	FAME1	1
Fall	6	F	Rough-legged Hawk	BULA1	1
Fall	6	O	American Kestrel	FASP1	1
Fall	7	H	Red-tailed Hawk	BUJA1	1
Fall	7	I	Red-tailed Hawk	BUJA1	1
Fall	7	J	Great Horned Owl	BUVI1	1
Fall	7	L	Northern Harrier	CICY1	1
Fall	7	N	Red-tailed Hawk	BUJA1	1
Fall	8	S	Red-tailed Hawk	BUJA1	1
Fall	9	Q	Red-tailed Hawk	BUJA1	1
Fall	10	I	American Kestrel	FASP1	1
Fall	10	Q	Red-tailed Hawk	BUJA1	1
Fall	11	D	Northern Harrier	CICY1	1
Fall	11	H	Rough-legged Hawk	BULA1	1
Fall	11	M	Great Horned Owl	BUVI1	2
Fall	11	P	Great Horned Owl	BUVI1	1
Fall	12	E	Northern Harrier	CICY1	1
Fall	12	F	Northern Harrier	CICY1	1
Fall	12	N	Northern Harrier	CICY1	1
Fall	12	O	Red-tailed Hawk	BUJA1	1
Fall	12	Q	American Kestrel	FASP1	1
Fall	12	Q	Golden Eagle	AQCH1	1
Fall	13	E	Red-tailed Hawk	BUJA1	1
Fall	13	G	Great Horned Owl	BUVI1	3
Fall	13	G	Northern Harrier	CICY1	1
Fall	13	G	Red-tailed Hawk	BUJA1	1
Fall	13	H	Great Horned Owl	BUVI1	1
Fall	13	H	Northern Harrier	CICY1	2
Fall	13	L	American Kestrel	FASP1	1
Fall	14	F	American Kestrel	FASP1	1
Fall	14	H	Northern Harrier	CICY1	1

Table 3-17. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Fall	14	H	Rough-legged Hawk	BULA1	1
Fall	14	J	Northern Harrier	CICY1	1
Fall	14	L	American Kestrel	FASP1	1
Fall	15	K	Northern Harrier	CICY1	1
Fall	15	N	Northern Harrier	CICY1	2
Fall	16	M	Northern Harrier	CICY1	1
Fall	16	M	Red-tailed Hawk	BUJA1	3
Winter	2	L	Golden Eagle	AQCH1	1
Winter	2	R	American Kestrel	FASP1	1
Winter	2	T	Rough-legged Hawk	BULA1	1
Winter	3	L	Golden Eagle	AQCH1	1
Winter	4	K	Golden Eagle	AQCH1	1
Winter	4	P	Red-tailed Hawk	BUJA1	1
Winter	4	S	Great Horned Owl	BUVI1	1
Winter	5	P	American Kestrel	FASP1	1
Winter	5	P	Red-tailed Hawk	BUJA1	1
Winter	5	Q	Rough-legged Hawk	BULA1	1
Winter	5	R	Great Horned Owl	BUVI1	1
Winter	6	S	Red-tailed Hawk	BUJA1	1
Winter	7	E	Red-tailed Hawk	BUJA1	1
Winter	7	I	American Kestrel	FASP1	1
Winter	7	I	Great Horned Owl	BUVI1	1
Winter	7	I	Rough-legged Hawk	BULA1	1
Winter	7	K	Bald Eagle	HALE1	1
Winter	7	K	Rough-legged Hawk	BULA1	1
Winter	7	L	American Kestrel	FASP1	2
Winter	7	N	Great Horned Owl	BUVI1	1
Winter	7	N	Red-tailed Hawk	BUJA1	1
Winter	10	F	Rough-legged Hawk	BULA1	1
Winter	10	P	American Kestrel	FASP1	2
Winter	10	P	Golden Eagle	AQCH1	2
Winter	11	E	Golden Eagle	AQCH1	1
Winter	11	M	Great Horned Owl	BUVI1	17
Winter	12	O	American Kestrel	FASP1	2
Winter	12	O	Great Horned Owl	BUVI1	1
Winter	12	O	Northern Harrier	CICY1	1
Winter	12	S	Golden Eagle	AQCH1	1
Winter	13	G	American Kestrel	FASP1	1
Winter	13	G	Great Horned Owl	BUVI1	5
Winter	13	H	Golden Eagle	AQCH1	1
Winter	13	H	Great Horned Owl	BUVI1	2
Winter	13	H	Northern Harrier	CICY1	1
Winter	13	M	Rough-legged Hawk	BULA1	1
Winter	13	R	Northern Harrier	CICY1	1

Table 3-17. (cont.)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Winter	14	N	Ferruginous Hawk	BURE1	1
Winter	14	O	Red-tailed Hawk	BUJA1	1
Winter	14	Q	Rough-legged Hawk	BULA1	1
Winter	15	G	Rough-legged Hawk	BULA1	1
Winter	15	G	Rough-legged Hawk	BULA1	1
Winter	15	I	Great Horned Owl	BUVI1	1
Winter	15	I	Rough-legged Hawk	BULA1	1
Winter	15	P	American Kestrel	FASP1	1
Winter	15	R	Golden Eagle	AQCH1	1
Winter	16	K	Rough-legged Hawk	BULA1	1
Winter	16	P	Bald Eagle	HALE1	1

Note: RF Grid = grid coordinate; SpecCode = species code

Table 3-18. Boreal Chorus Frog vocalization index data (1998-2000)

Site	1998	1999	2000
1	3	3	2
2	3	3	2
3	3	NA	NA
4	2	3	2
5	3	3	3
6	3	3	2
7	3	3	2
8	NA	3	3
9	1	2	2
10	3	3	3
11	3	3	1
12	0	0	3
13	3	3	3
14	2	3	3
15	0	0	2
16	0	0	1
17	1	0	0
18	1	3	2
19	NA	2	3
20	NA	2	3
21	NA	0	1

Note: NA - sites not surveyed during certain years

Table 3-19. Herpetile relative abundance by season (1995-2000)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	Spring	20	Boreal Chorus Frog	PSTR1	2	75	0.0267	30	6.67	1273	0.0236
2000	Spring	30	Boreal Chorus Frog	PSTR1	20	120	0.1667	30	66.67	1273	0.0236
2000	Spring	110	Boreal Chorus Frog	PSTR1	3	341	0.0088	30	10.00	1273	0.0236
2000	Spring	230	Boreal Chorus Frog	PSTR1	5	184	0.0272	30	16.67	1273	0.0236
2000	Spring	54	Western Painted Turtle	CHPI1	8	107	0.0748	9	88.89	1273	0.0071
2000	Spring	93	Western Painted Turtle	CHPI1	1	23	0.0435	9	11.11	1273	0.0071
2000	Spring	211	Prairie Rattlesnake	CRVI1	1	28	0.0357	1	100.00	1273	0.0008
1999	Spring	10	Boreal Chorus Frog	PSTR1	3	37	0.0811	145	2.07	1302	0.1114
1999	Spring	20	Boreal Chorus Frog	PSTR1	8	104	0.0769	145	5.52	1302	0.1114
1999	Spring	30	Boreal Chorus Frog	PSTR1	12	107	0.1121	145	8.28	1302	0.1114
1999	Spring	51	Boreal Chorus Frog	PSTR1	27	3	9.0000	145	18.62	1302	0.1114
1999	Spring	54	Boreal Chorus Frog	PSTR1	77	112	0.6875	145	53.10	1302	0.1114
1999	Spring	211	Boreal Chorus Frog	PSTR1	1	26	0.0385	145	0.69	1302	0.1114
1999	Spring	212	Boreal Chorus Frog	PSTR1	4	105	0.0381	145	2.76	1302	0.1114
1999	Spring	230	Boreal Chorus Frog	PSTR1	13	147	0.0884	145	8.97	1302	0.1114
1999	Spring	30	Western Painted Turtle	CHPI1	17	107	0.1589	25	68.00	1302	0.0192
1999	Spring	54	Western Painted Turtle	CHPI1	8	112	0.0714	25	32.00	1302	0.0192
1999	Spring	54	Northern Leopard Frog	RAPI1	4	112	0.0357	4	100.00	1302	0.0031
1998	Spring	10	Boreal Chorus Frog	PSTR1	2	46	0.0435	94	2.13	1263	0.0744
1998	Spring	20	Boreal Chorus Frog	PSTR1	6	121	0.0496	94	6.38	1263	0.0744
1998	Spring	30	Boreal Chorus Frog	PSTR1	34	54	0.6296	94	36.17	1263	0.0744
1998	Spring	43	Boreal Chorus Frog	PSTR1	2	3	0.6667	94	2.13	1263	0.0744
1998	Spring	54	Boreal Chorus Frog	PSTR1	30	113	0.2655	94	31.91	1263	0.0744
1998	Spring	110	Boreal Chorus Frog	PSTR1	13	337	0.0386	94	13.83	1263	0.0744
1998	Spring	212	Boreal Chorus Frog	PSTR1	2	96	0.0208	94	2.13	1263	0.0744
1998	Spring	230	Boreal Chorus Frog	PSTR1	5	176	0.0284	94	5.32	1263	0.0744
1998	Spring	54	Western Painted Turtle	CHPI1	16	113	0.1416	16	100.00	1263	0.0127
1998	Spring	322	Prairie Rattlesnake	CRVI1	1	100	0.0100	1	100.00	1263	0.0008

Table 3-19. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	Spring	20	Boreal Chorus Frog	PSTR1	4	172	0.0233	129	3.10	1580	0.0816
1997	Spring	30	Boreal Chorus Frog	PSTR1	6	99	0.0606	129	4.65	1580	0.0816
1997	Spring	43	Boreal Chorus Frog	PSTR1	24	8	3.0000	129	18.60	1580	0.0816
1997	Spring	51	Boreal Chorus Frog	PSTR1	5	1	5.0000	129	3.88	1580	0.0816
1997	Spring	54	Boreal Chorus Frog	PSTR1	83	150	0.5533	129	64.34	1580	0.0816
1997	Spring	110	Boreal Chorus Frog	PSTR1	7	411	0.0170	129	5.43	1580	0.0816
1997	Spring	30	Western Painted Turtle	CHPI1	1	99	0.0101	3	33.33	1580	0.0019
1997	Spring	54	Western Painted Turtle	CHPI1	2	150	0.0133	3	66.67	1580	0.0019
1996	Spring	20	Boreal Chorus Frog	PSTR1	38	132	0.2879	194	19.59	1726	0.1124
1996	Spring	30	Boreal Chorus Frog	PSTR1	14	91	0.1538	194	7.22	1726	0.1124
1996	Spring	41	Boreal Chorus Frog	PSTR1	5	2	2.5000	194	2.58	1726	0.1124
1996	Spring	43	Boreal Chorus Frog	PSTR1	15	10	1.5000	194	7.73	1726	0.1124
1996	Spring	51	Boreal Chorus Frog	PSTR1	3	2	1.5000	194	1.55	1726	0.1124
1996	Spring	54	Boreal Chorus Frog	PSTR1	97	181	0.5359	194	50.00	1726	0.1124
1996	Spring	211	Boreal Chorus Frog	PSTR1	3	86	0.0349	194	1.55	1726	0.1124
1996	Spring	212	Boreal Chorus Frog	PSTR1	8	143	0.0559	194	4.12	1726	0.1124
1996	Spring	230	Boreal Chorus Frog	PSTR1	6	174	0.0345	194	3.09	1726	0.1124
1996	Spring	324	Boreal Chorus Frog	PSTR1	5	53	0.0943	194	2.58	1726	0.1124
1996	Spring	54	Western Painted Turtle	CHPI1	4	181	0.0221	7	57.14	1726	0.0041
1996	Spring	93	Western Painted Turtle	CHPI1	2	28	0.0714	7	28.57	1726	0.0041
1996	Spring	110	Western Painted Turtle	CHPI1	1	304	0.0033	7	14.29	1726	0.0041
1995	Spring	20	Boreal Chorus Frog	PSTR1	2	90	0.0222	63	3.17	1786	0.0353
1995	Spring	30	Boreal Chorus Frog	PSTR1	5	163	0.0307	63	7.94	1786	0.0353
1995	Spring	51	Boreal Chorus Frog	PSTR1	3	3	1.0000	63	4.76	1786	0.0353
1995	Spring	54	Boreal Chorus Frog	PSTR1	51	111	0.4595	63	80.95	1786	0.0353
1995	Spring	93	Boreal Chorus Frog	PSTR1	2	44	0.0455	63	3.17	1786	0.0353
1995	Spring	54	Western Painted Turtle	CHPI1	7	111	0.0631	7	100.00	1786	0.0039
1995	Spring	322	Great Plains Toad	BUCO1	1	284	0.0035	1	100.00	1786	0.0006
2000	Summer	54	Western Painted Turtle	CHPI1	23	97	0.2371	31	74.19	1296	0.0239
2000	Summer	93	Western Painted Turtle	CHPI1	8	35	0.2286	31	25.81	1296	0.0239
2000	Summer	30	Bullfrog	RACA1	2	112	0.0179	6	33.33	1296	0.0046
2000	Summer	54	Boreal Chorus Frog	PSTR1	6	97	0.0619	6	100.00	1296	0.0046
2000	Summer	93	Bullfrog	RACA1	3	35	0.0857	6	50.00	1296	0.0046
2000	Summer	110	Bullfrog	RACA1	1	338	0.0030	6	16.67	1296	0.0046

Table 3-19. (cont.)

Year	Season	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	Summer	30	Western Painted Turtle	CHPI1	9	109	0.0826	43	20.93	1547	0.0278
1999	Summer	54	Western Painted Turtle	CHPI1	26	104	0.2500	43	60.47	1547	0.0278
1999	Summer	93	Western Painted Turtle	CHPI1	8	39	0.2051	43	18.60	1547	0.0278
1999	Summer	323	Short-horned Lizard	PHDO1	11	159	0.0692	11	100.00	1547	0.0071
1999	Summer	30	Northern Leopard Frog	RAPI1	2	109	0.0183	10	20.00	1547	0.0065
1999	Summer	93	Northern Leopard Frog	RAPI1	8	39	0.2051	10	80.00	1547	0.0065
1999	Summer	30	Bullfrog	RACA1	3	109	0.0275	5	60.00	1547	0.0032
1999	Summer	54	Bullfrog	RACA1	2	104	0.0192	5	40.00	1547	0.0032
1999	Summer	54	Snapping Turtle	CHSE1	1	104	0.0096	1	100.00	1547	0.0006
1998	Summer	54	Western Painted Turtle	CHPI1	16	131	0.1221	18	88.89	1339	0.0134
1998	Summer	93	Western Painted Turtle	CHPI1	2	28	0.0714	18	11.11	1339	0.0134
1998	Summer	54	Bullfrog	RACA1	3	131	0.0229	3	100.00	1339	0.0022
1998	Summer	323	Short-horned lizard	PHDO1	2	170	0.0118	2	100.00	1339	0.0015
1998	Summer	212	Prairie Rattlesnake	CRVI1	1	79	0.0127	1	100.00	1339	0.0007
1997	Summer	30	Western Painted Turtle	CHPI1	2	129	0.0155	20	10.00	1361	0.0147
1997	Summer	54	Western Painted Turtle	CHPI1	17	102	0.1667	20	85.00	1361	0.0147
1997	Summer	93	Western Painted Turtle	CHPI1	1	31	0.0323	20	5.00	1361	0.0147
1997	Summer	93	Northern Leopard Frog	RAPI1	2	31	0.0645	2	100.00	1361	0.0015
1997	Summer	30	Tiger Salamander	AMTI1	1	129	0.0078	1	100.00	1361	0.0007
1997	Summer	54	Bullfrog	RACA1	1	102	0.0098	1	100.00	1361	0.0007
1997	Summer	110	Bullsnake	PIME1	1	327	0.0031	1	100.00	1361	0.0007
1996	Summer	43	Western Plains Garter Snake	THRA1	1	6	0.1667	1	100.00	1609	0.0006
1996	Summer	43	Red-sided Garter Snake	THSI1	1	6	0.1667	1	100.00	1609	0.0006
1996	Summer	10	Prairie Rattlesnake	CRVI1	1	79	0.0127	2	50.00	1609	0.0012
1996	Summer	211	Prairie Rattlesnake	CRVI1	1	66	0.0152	2	50.00	1609	0.0012
1996	Summer	30	Western Painted Turtle	CHPI1	3	132	0.0227	13	23.08	1609	0.0081
1996	Summer	54	Western Painted Turtle	CHPI1	10	85	0.1176	13	76.92	1609	0.0081

Table 3-19. (cont.)

Year	Season	Hab 1	Common Name	Spec Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	Summer	54	Western Painted Turtle	CHPI1	7	77	0.0909	7	100.00	2269	0.0031
1995	Summer	110	Bullsnake	PIME1	1	312	0.0032	2	50.00	2269	0.0009
1995	Summer	211	Prairie Rattlesnake	CRVI1	1	38	0.0263	2	50.00	2269	0.0009
1995	Summer	322	Prairie Rattlesnake	CRVI1	1	299	0.0033	2	50.00	2269	0.0009
1995	Summer	322	Bullsnake	PIME1	1	299	0.0033	2	50.00	2269	0.0009
1995	Summer	20	Red-sided Garter Snake	THSI1	1	102	0.0098	1	100.00	2269	0.0004
1995	Summer	51	Tiger Salamander	AMTI1	1	12	0.0833	1	100.00	2269	0.0004
1995	Summer	51	Boreal Chorus Frog	PSTR1	1	12	0.0833	1	100.00	2269	0.0004
2000	Fall	54	Western Painted Turtle	CHPI1	11	113	0.0973	13	84.62	1132	0.0115
2000	Fall	93	Western Painted Turtle	CHPI1	2	5	0.4000	13	15.38	1132	0.0115
2000	Fall	54	Bullfrog	RACA1	3	113	0.0265	3	100.00	1132	0.0027
1999	Fall	54	Western Painted Turtle	CHPI1	62	113	0.5487	62	100.00	1356	0.0457
1999	Fall	30	Bullfrog	RACA1	1	125	0.0080	2	50.00	1356	0.0015
1999	Fall	54	Bullfrog	RACA1	1	113	0.0088	2	50.00	1356	0.0015
1998	Fall	54	Western Painted Turtle	CHPI1	6	103	0.0583	6	100.00	1210	0.0050
1998	Fall	230	Northern Leopard Frog	RAPI1	2	164	0.0122	2	100.00	1210	0.0017
1998	Fall	54	Bullfrog	RACA1	1	103	0.0097	1	100.00	1210	0.0008
1998	Fall	322	Prairie Rattlesnake	CRVI1	1	90	0.0111	1	100.00	1210	0.0008
1997	Fall	54	Western Painted Turtle	CHPI1	17	82	0.2073	17	100.00	1221	0.0139
1996	Fall	20	Western Painted Turtle	CHPI1	1	109	0.0092	4	25.00	1418	0.0028
1996	Fall	54	Western Painted Turtle	CHPI1	3	103	0.0291	4	75.00	1418	0.0028
1996	Fall	20	Bullfrog	RACA1	1	109	0.0092	1	100.00	1418	0.0007
1995	Fall	54	Western Painted Turtle	CHPI1	2	134	0.0149	2	100	1837	0.0011
1995	Winter	30	Western Painted Turtle	CHPI1	1	124	0.0081	1	100	1496	0.0007

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-20. Seasonal herpetile area use (1997-2000)

Season	RF Grid N	RF Grid E	Common Name	Spec Code	Sum of Total Observations
Spring	2	U	Boreal Chorus Frog	PSTR1	4
Spring	5	Q	Boreal Chorus Frog	PSTR1	10
Spring	5	R	Boreal Chorus Frog	PSTR1	5
Spring	7	I	Boreal Chorus Frog	PSTR1	5
Spring	7	J	Boreal Chorus Frog	PSTR1	2
Spring	7	L	Boreal Chorus Frog	PSTR1	4
Spring	7	N	Boreal Chorus Frog	PSTR1	3
Spring	7	P	Boreal Chorus Frog	PSTR1	6
Spring	10	O	Boreal Chorus Frog	PSTR1	8
Spring	11	N	Boreal Chorus Frog	PSTR1	90
Spring	12	F	Boreal Chorus Frog	PSTR1	10
Spring	12	L	Boreal Chorus Frog	PSTR1	3
Spring	12	N	Boreal Chorus Frog	PSTR1	10
Spring	12	O	Boreal Chorus Frog	PSTR1	5
Spring	12	P	Boreal Chorus Frog	PSTR1	1
Spring	12	Q	Boreal Chorus Frog	PSTR1	15
Spring	15	J	Boreal Chorus Frog	PSTR1	16
Spring	16	L	Boreal Chorus Frog	PSTR1	50
Spring	17	N	Boreal Chorus Frog	PSTR1	8
Spring	10	O	Prairie rattlesnake	CRVI1	1
Summer	2	U	Bullfrog	RACA1	2
Summer	4	T	Prairie rattlesnake	CRVI1	1
Summer	3	R	Western Painted Turtle	CHPI1	2
Summer	10	O	Western Painted Turtle	CHPI1	4
Summer	13	H	Western Painted Turtle	CHPI1	2
Fall	7	N	Bullsnake	PIME1	1
Fall	9	L	Prairie rattlesnake	CRVI1	1

Note: RF Grid = grid coordinate; SpecCode = species code

Table 3-21. Bird distribution by habitat based on observations from 1991, 1992

Species Common Name	Species Scientific Name	Spec Code	Seasonal Abundance				Habitats				Neotro Breeding Mig (1) Status
Sp	Su	Fa	Wi	G	D	T	R	W	M		
GREBES			PODICIPEDIDAE								
Western Grebe	<i>Aechmophorus occidentalis</i>	AEOC1	R		R				X		Confirmed
Eared Grebe	<i>Podiceps nigricollis</i>	PONI1	R		R				X		
Pied-billed Grebe	<i>Podilymbus podiceps</i>	POPO1	U	U	U				X		
PELICANS			PELECANIDAE								
American White Pelican (2)	<i>Pelecanus erythrorhynchos</i>	PEER1	O	O					X		
CORMORANTS			PHALACROCORACIDAE								
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	PHAU1	O	C	O			X	X		
HERONS			ARDEIDAE								
Great Blue Heron	<i>Ardea herodias</i>	ARHE1	U	C	U		X	X	X	X	Confirmed
Great Egret	<i>Casmerodius albus</i>	CAAL1	R						X		
American Bittern	<i>Botarus lentiginosus</i>	BOLE1			R				X		
Green-backed Heron	<i>Butorides striatus</i>	BUST1	O						X		
Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	NYNY1	U	C			X	X	X	X	
White-faced Ibis (3)	<i>Plegadis chihi</i>	PLCH1			R				X		
GEESE AND DUCKS			ANATIDAE								
Wood Duck	<i>Aix sponsa</i>	AISP1			R				X		Confirmed
Northern Pintail	<i>Anas acuta</i>	ANAC1	O	O					X		
American Wigeon	<i>Anas americana</i>	ANAM1	O	O		O			X		
Northern Shoveler	<i>Anas clypeata</i>	ANCL1	U	U	U				X		Confirmed
Green-winged Teal	<i>Anas crecca</i>	ANCR1	C	U	O	U			X		
Cinnamon Teal	<i>Anas cyanoptera</i>	ANCY1	C	O					X		
Blue-winged Teal	<i>Anas discors</i>	ANDI1	C	O	C				X		Confirmed
Mallard	<i>Anas platyrhynchos</i>	ANPL1	A	A	C	C	X	X	X	X	
Gadwall	<i>Anas strepera</i>	ANST1	C	U	U				X		
Greater Scaup	<i>Aythya marila</i>	AYMA1	O		O				X		Confirmed
Lesser Scaup	<i>Aythya affinis</i>	AYAF1	C		U	U			X		
Redhead	<i>Aythya americana</i>	AYAM1	U	U		U			X		
Ring-necked Duck	<i>Aythya collaris</i>	AYCO1	U		U				X		Confirmed
Canvasback	<i>Aythya valisineria</i>	AYVA1				U			X		
Canada Goose	<i>Branta canadensis</i>	BRCA1	U	U	U	U	X		X	X	
Bufflehead	<i>Bucephala albeola</i>	BUAL1	U		C	U		X	X	X	Confirmed
Common Goldeneye	<i>Bucephala clangula</i>	BUCL1	U		U	U			X		
Snow Goose	<i>Chen caerulescens</i>	CHCA1			U		X		X		
Hooded Merganser	<i>Lophodytes cucullatus</i>	LOCU1	O						X		Confirmed
Common Merganser	<i>Mergus merganser</i>	MEME1	U		O				X		
Ruddy Duck	<i>Oxyura jamaicensis</i>	OXJA1	R	R	R				X		
AMERICAN VULTURES			CATHARTIDAE								
Turkey Vulture	<i>Cathartes aura</i>	CAAU1	O	O	O		X	X	X	X	Yes
Black Vulture	<i>Coragyps atratus</i>	COAT1			R				X		

Table 3-21. (cont.)

Species Common Name	Species Scientific Name	Spec Code	Seasonal Abundance				Habitats				Neotro Breeding Mig (1) Status		
			Sp	Su	Fa	Wi	G	D	T	R	W	M	
EAGLES AND HAWKS ACCIPITRIDAE													
Cooper's Hawk	<i>Accipiter cooperii</i>	ACCO1		R	R			X					Yes
Northern Goshawk (3)	<i>Accipiter gentilis</i>	ACGE1				R	X	X					Yes
Sharp-shinned Hawk	<i>Accipiter striatus</i>	ACST1	U		U		X	X	X	X			Yes
Golden Eagle	<i>Aquila chrysaetos</i>	AQCH1	O	O	O	O	X	X	X	X	X		Yes
Red-tailed Hawk	<i>Buteo jamaicensis</i>	BUJA1	C	C	C	C	X	X	X	X	X		Yes Confirmed
Rough-legged Hawk	<i>Buteo lagopus</i>	BULA1	O		C	C	X	X	X	X	X		
Broad-winged Hawk*	<i>Buteo platypterus</i>	BUPL1	R				X		X				Yes
Ferruginous Hawk (2,3)	<i>Buteo regalis</i>	BURE1	U	U	U	U	X	X	X	X	X		Yes
Swainson's Hawk	<i>Buteo swainsoni</i>	BUSW1	U	U	O		X	X	X	X	X		Yes Confirmed
Northern Harrier	<i>Circus cyaneus</i>	CICY1	O	U	O	U	X	X	X	X	X		Yes Suspected
Bald Eagle (4)	<i>Haliaeetus leucocephalus</i>	HALE1				O	O	X	X		X		
Osprey	<i>Pandion haliaetus</i>	PAHA1		R	R						X		
FALCONS FALCONIDAE													
Merlin	<i>Falco columbarius</i>	FACO1	R			R		X	X				Yes
Prairie Falcon	<i>Falco mexicanus</i>	FAME1	O		O	O	X	X	X	X	X		Yes
Peregrine Falcon	<i>Falco peregrinus</i>	FAPE1	R		R	R	X	X	X	X			Yes
American Kestrel	<i>Falco sparverius</i>	FASP1	O	U	U	O	X	X	X	X	X		Yes Confirmed
GROUSE AND TURKEYS PHASIANIDAE													
Wild Turkey	<i>Meleagris gallopavo</i>	MEGA1	R					X					
Ring-necked Pheasant	<i>Phasianus colchicus</i>	PHCO1	U	U	U	U	X		X	X	X		Suspected
RAILS AND COOTS RALLIDAE													
American Coot	<i>Fulica americana</i>	FUAM1	U	U	U		X		X	X			Confirmed
Sora	<i>Porzana carolina</i>	POCA1		U					X				Suspected
Virginia Rail	<i>Rallus limicola</i>	RALI1	U						X				Suspected
CRANES GRUIDAE													
Sandhill Crane (2)	<i>Grus canadensis</i>	GRCA1			O		X		X				
PLOVERS CHARADRIIDAE													
Killdeer	<i>Charadrius vociferus</i>	CHVO1	C	C	U		X	X	X	X	X		Confirmed
STILTS AND AVOCETS RECURVIROSTRIDAE													
American Avocet	<i>Recurvirostra americana</i>	REAM1	U						X				
SANDPIPERS AND ALLIES SCOLOPACIDAE													
Spotted Sandpiper	<i>Actitis macularia</i>	ACMA1	C	U					X				
Pectoral Sandpiper	<i>Calidris melanotos</i>	CAME1	O	O					X				
Semipalmated Sandpiper	<i>Calidris pusilla</i>	CAPU1	R						X				
Willet	<i>Catoptrophorus semipalma</i>	CASE1	U	O					X				

Table 3-21. (cont.)

Species Common Name	Species Scientific Name	Spec Code	Seasonal Abundance				Habitats				Neotro Breeding	
			Sp	Su	Fa	Wi	G	D	T	R	W	Mig (1) Status
Common Snipe	<i>Gallinago gallinago</i>	GAGA1	U	C	U					X	X	Confirmed
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>	LISC1	O								X	
Long-billed Curlew (2)	<i>Numenius americanus</i>	NUAM1	R			R	X	X				Yes
Wilson's Phalarope	<i>Phalaropus tricolor</i>	PHTR1	U								X	
Lesser Yellowlegs	<i>Tringa flavipes</i>	TRFL1	O	O							X	
Greater Yellowlegs	<i>Tringa melanoleuca</i>	TRME1		R							X	
Solitary Sandpiper	<i>Tringa solitaria</i>	TRSO1	U	O							X	
GULLS			LARIDAE									
Ring-billed Gull	<i>Larus delawarensis</i>	LADE1	C	O	O	O	X	X	X	X		
Franklin's Gull	<i>Larus pipixcan</i>	LAPI1			O		X				X	
PIGEONS AND DOVES			COLUMBIDAE									
Band-tailed Pigeon	<i>Columba fasciata</i>	COFA1		O			X					Yes Confirmed
Rock Dove	<i>Columba livia</i>	COLI1	C	C	C	C	X	X	X	X		Confirmed
Mourning Dove	<i>Zenaidura macroura</i>	ZEMA1	C	C	C		X	X	X	X	X	Confirmed
CUCKOOS			CUCULIDAE									
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	COER1		R						X		Yes
OWLS			STRIGIDAE									
Short-eared Owl	<i>Asio flammeus</i>	ASFL1	O	O	O	O	X	X	X	X		Yes
Long-eared Owl	<i>Asio otus</i>	ASOT1	O	O	O					X	X	Yes
Burrowing Owl (5)	<i>Athene cunicularia</i>	ATCU1	R	R			X					Yes
Great Horned Owl	<i>Bubo virginianus</i>	BUVI1	C	C	C	C	X	X	X	X	X	Confirmed
Barn Owl	<i>Tyto alba</i>	TYAL1				R					X	
NIGHT JARS			CAPRIMULGIDAE									
Common Nighthawk	<i>Chordeiles minor</i>	CHMI1	U	U			X	X	X	X	X	Yes Confirmed
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	PHNU1		C			X	X				Yes
SWIFTS			APODIDAE									
Black Swift (3)	<i>Cypseloides niger</i>	CYNI1	R				X					Yes
HUMMINGBIRDS			TROCHILIDAE									
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>	SEPL1		O			X	X	X	X		Yes Suspected
Rufous Hummingbird	<i>Selasphorus rufus</i>	SERU1		O						X		Yes
KINGFISHERS			ALCEDINIDAE									
Belted Kingfisher	<i>Ceryle alcyon</i>	CEAL1	O	O	O					X	X	Yes

Table 3-21. (cont.)

Species Common Name	Species Scientific Name	Spec Code	Seasonal Abundance				Habitats				Neotro Breeding	
			Sp	Su	Fa	Wi	G	D	T	R	Mig (1)	Status
WOODPECKERS		PICIDAE										
Northern Flicker	<i>Colaptes auratus</i>	COAU1	U	U	C	C	X	X	X	X	X	Suspectec
Downy Woodpecker	<i>Picoides pubescens</i>	PIPU1		O	O	O		X	X	X		Suspectec
Hairy Woodpecker	<i>Picoides villosus</i>	PIVI1			O			X	X	X		
Red-naped Sapsucker	<i>Sphyrapicus nuchalis</i>	SPNU1			O				X		Yes	
TYRANT FLYCATCHERS		TYRANNIDAE										
Olive-sided Flycatcher	<i>Contopus borealis</i>	COBO1			O				X		Yes	
Western Wood-Pewee	<i>Contopus sordidulus</i>	COSO1	U	U	O		X	X	X	X	Yes	
Hammond's Flycatcher	<i>Empidonax hammondi</i>	EMHA1	U						X		Yes	
Dusky Flycatcher	<i>Empidonax oberholseri</i>	EMOB1	U		O				X	X	Yes	
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>	EMDI1	U		O			X	X	X	Yes	
Willow Flycatcher	<i>Empidonax traillii</i>	EMTR1	U						X		Yes	
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	MYCI1	R					X			Yes	
Eastern Phoebe	<i>Sayornis phoebe</i>	SAPH1	R						X		Yes	
Say's Phoebe	<i>Sayornis saya</i>	SASA1	C	C	U		X	X	X	X	X	Yes Confirmed
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>	TYFO1	R					X			Yes	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	TYTY1	O	C			X	X	X	X	Yes	Confirmed
Western Kingbird	<i>Tyrannus verticalis</i>	TYVE1	C	C	U		X	X	X	X	Yes	Confirmed
LARKS		ALAUDIDAE										
Horned Lark	<i>Eremophila alpestris</i>	ERAL1	U	O	U	C	X	X	X	X	Yes	Confirmed
SWALLOWS		HIRUNDINIDAE										
Cliff Swallow	<i>Hirundo pyrrhonota</i>	HIPY1	U	C	U		X	X	X	X	Yes	Confirmed
Barn Swallow	<i>Hirundo rustica</i>	HIRU1	C	A	U		X	X	X	X	Yes	Confirmed
Northern Rough-winged Sw	<i>Steigodopteryx serripennis</i>	STSE1	O				X		X		Yes	
Tree Swallow	<i>Tachycineta bicolor</i>	TABI1	C	C	O		X	X	X	X	Yes	Suspectec
Violet-green Swallow	<i>Tachycineta thalassina</i>	TATH1	U	U			X	X	X	X	Yes	Suspectec
CROWS, JAYS, MAGPIES		CORVIDAE										
American Crow	<i>Corvus brachyrhynchos</i>	COBR1	O	O	O	O	X	X	X			
Common Raven	<i>Corvus corax</i>	COCO1	U	O	O	U	X	X	X	X	Confirmed	
Blue Jay	<i>Cyanocitta cristata</i>	CYCR1		U	U		X	X	X	X		
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>	GYCY1		O				X				
Black-billed Magpie	<i>Pica pica</i>	PIPI1	C	C	C	C	X	X	X	X	Confirmed	
TITMICE		PARIDAE										
Black-capped Chickadee	<i>Parus atricapillus</i>	PAAT1	O	O	O	O	X	X	X		Confirmed	
Mountain Chickadee	<i>Parus gambeli</i>	PAGA1	R					X				

Table 3-21. (cont.)

Species Common Name	Species Scientific Name	Spec Code	Seasonal Abundance				Habitats				Neotro Breeding	
			Sp	Su	Fa	Wi	G	D	T	R	Mig (1)	Status
WRENS		TROGLODYTIDAE										
Marsh Wren	<i>Cistothorus palustris</i>	CIPA1	U	U	U			X		X	Yes	Suspected
Rock Wren	<i>Salpinctes obsoletus</i>	SAOB1	C	C	U			X	X	X		
House Wren	<i>Troglodytes aedon</i>	TRAE1	U	O	O			X	X	X	Yes	Suspected
Winter Wren	<i>Troglodytes troglodytes</i>	TRTR1				R				X		
MUSCICAPIDS		MUSCICAPIDAE										
Hermit Thrush	<i>Catharus guttatus</i>	CAGU1	U					X	X	X	Yes	
Swainson's Thrush	<i>Catharus ustulatus</i>	CAUS1		U				X	X		Yes	
Townsend's Solitaire	<i>Myadestes townsendi</i>	MYTO1	U			O				X	Yes	
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	POCA2	U		R			X	X	X	Yes	Confirmed
Ruby-crowned Kinglet	<i>Regulus calendula</i>	RECA1			C					X	Yes	Suspected
Golden-crowned Kinglet	<i>Regulus satrapa</i>	RESA1		R				X	X	X		
Mountain Bluebird	<i>Sialia currucoides</i>	SICU1	U		U			X	X		Yes	
Western Bluebird	<i>Sialia mexicana</i>	SIME1	R							X	Yes	
American Robin	<i>Turdus migratorius</i>	TUMI1	C	C	U	O		X	X	X	Yes	Confirmed
THRASHERS		MIMIDAE										
Gray Catbird	<i>Dumetella carolinensis</i>	DUCA1	U	U					X		Yes	Suspected
Northern Mockingbird	<i>Mimus polyglottos</i>	MIPO1	R	R	R			X		X		Suspected
Sage Thrasher	<i>Oreoscoptes montanus</i>	ORMO1	U	U	U			X	X	X	Yes	Suspected
Brown Thrasher	<i>Toxostoma rufum</i>	TORU1		R						X		
PIPITS		MOTACILLIDAE										
American Pipit	<i>Anthus rubescens</i>	ANRU1	U		U			X		X	Yes	
WAXWINGS		BOMBYCILLIDAE										
Bohemian Waxwing	<i>Bombycilla garrulus</i>	BOGA1				U		X				
SHRIKES		LANIIDAE										
Northern Shrike	<i>Lanius excubitor</i>	LAEX1				O				X		
Loggerhead Shrike (3)	<i>Lanius ludovicianus</i>	LALU1	U	O	O	O		X	X	X	Yes	Suspected
STARLINGS		STURNIDAE										
European Starling	<i>Sturnus vulgaris</i>	STVU1	C	A	C	U		X	X	X		Confirmed
VIREOS		VIREONIDAE										
Warbling Vireo	<i>Vireo gilvus</i>	VEGI1	U	U					X		Yes	Suspected
Solitary Vireo	<i>Vireo solitarius</i>	VISO1			O				X		Yes	

Table 3-21. (cont.)

Species	Species	Spec	Seasonal Abundance				Habitats				Neotro Breeding
Common Name	Scientific Name	Code	Sp	Su	Fa	Wi	G	D	T	R	Mig (1) Status
Palm Warbler	<i>Dendroica palmarum</i>	DEPA1			R		X			X	Yes
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	DEPE2		R				X			Yes Suspected
Yellow Warbler	<i>Dendroica petechia</i>	DEPE1	C	C	C		X	X	X	X	Yes Confirmed
Townsend's Warbler	<i>Dendroica townsendi</i>	DETO1			O					X	Yes
Common Yellowthroat	<i>Geothlypis trichas</i>	GETR1	U	C	C		X	X	X	X	Yes Confirmed
Yellow-breasted Chat	<i>Icteria virens</i>	ICVI1	U					X	X		Yes Suspected
MacGillivray's Warbler	<i>Oporornis tolmiei</i>	OPTO1			U		X	X	X	X	Yes
Ovenbird	<i>Seiurus aurocapillus</i>	SEAU1	R					X	X		Yes
American Redstart	<i>Setophaga ruticilla</i>	SERU2	R					X			Yes
Virginia's Warbler	<i>Vermivora virginiae</i>	VEVI1			R				X		Yes
Wilson's Warbler	<i>Wilsonia pusilla</i>	WIPU1			U			X	X	X	Yes
Orange-crowned Warbler	<i>Vermivora celata</i>	VECL1	R	R				X	X		Yes Suspected
TANAGERS			EMBERIZIDAE: Thraupinae								
Western Tanager	<i>Piranga ludoviciana</i>	PILU1	U		U				X		Yes
GROSBEAKS AND ALLIES			EMBERIZIDAE: Cardinalinae								
Blue Grosbeak	<i>Guiraca caerulea</i>	GUCA1	U	C	U		X	X	X		Yes Confirmed
Lazuli Bunting	<i>Passerina amoena</i>	PAAM1	O	O				X	X		Yes
Indigo Bunting	<i>Passerina cyanea</i>	PACY1	O	O					X		Yes
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	PHME1			O				X		Yes
TOWHEES AND SPARROWS			EMBERIZIDAE: Emberizinae								
Baird's Sparrow (3)	<i>Ammodramus bairdii</i>	AMBA1	R		R		X	X			Yes
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	AMSA1	C	C	U		X	X	X	X	Yes Confirmed
Lark Bunting	<i>Calamospiza melanocorys</i>	CAME3	O	O	O		X	X			Yes
Lapland Longspur	<i>Calcarius lapponicus</i>	CALA1				O	X				
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	CAOR1				R	X				Yes
Snow Bunting	<i>Plectrophenax nivalis</i>	PLNI1			R	R	X				
Lark Sparrow	<i>Chondestes grammacus</i>	CHGR1		O	O			X	X		Yes Suspected
Dark-eyed Junco	<i>Junco hyemalis</i>	JUHY1	U	U	U	O	X	X	X	X	Yes Suspected
Lincoln's Sparrow	<i>Melospiza lincolni</i>	MELI1	U		U				X	X	Yes
Fox Sparrow	<i>Passerella iliaca</i>	PAIL1			R			X			
Song Sparrow	<i>Melospiza melodia</i>	MEME2	C	C	C	U	X	X	X	X	Confirmed
Savannah Sparrow	<i>Passerculus sandwichensis</i>	PASA1	U	U	U		X	X	X	X	Yes Suspected
Green-tailed Towhee	<i>Pipilo chlorurus</i>	PICH1	U	U	O			X	X	X	Yes Suspected
Rufous-sided Towhee	<i>Pipilo erythrophthalmus</i>	PIER1	C	C	C	O	X	X	X	X	Yes Confirmed
Vesper Sparrow	<i>Pooecetes gramineus</i>	POGR1	A	A	C		X	X	X	X	Yes Confirmed
American Tree Sparrow	<i>Spizella arborea</i>	SPAR1	U		U	C	X	X	X	X	
Brewer's Sparrow	<i>Spizella breweri</i>	SPBR1		U	C		X	X	X		Yes
Field Sparrow	<i>Spizella pusilla</i>	SPPU1		R				X			
Clay-colored Sparrow	<i>Spizella pallida</i>	SPPA2			U	U	X	X	X	X	Yes
Chipping Sparrow	<i>Spizella passerina</i>	SPPA1	U	U	C	O	X	X	X	X	Yes

Table 3-21. (cont.)

Species	Species	Spec	Seasonal Abundance				Habitats				Neotro Breeding		
Common Name	Scientific Name	Code	Sp	Su	Fa	Wi	G	D	T	R	W	Mig (1)	Status
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	AGPH1	A	A	C	U	X	X	X	X	X	Yes	Confirmed
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	EUCY1	C	U	O		X	X	X	X	X	Yes	Confirmed
Northern Oriole	<i>Icterus galbula</i>	ICGA1	C	C			X	X	X	X		Yes	Confirmed
Brown-headed Cowbird	<i>Molothrus ater</i>	MOAT1	U	C			X	X	X	X		Yes	Suspected
Common Grackle	<i>Quiscalus quiscula</i>	QUQU1	U	C	O		X	X	X	X			Confirmed
Western Meadowlark	<i>Sturnella neglecta</i>	STNE1	A	A	A	O	X	X	X	X	X	Yes	Confirmed
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	XAXA1	C	C							X	Yes	Confirmed
FINCHES			FRINGILLIDAE										
Pine Siskin	<i>Carduelis pinus</i>	CAPI1	U	O	O	O	X	X	X	X	X	Yes	
Lesser Goldfinch	<i>Carduelis psaltria</i>	CAPS1	O	U	O		X	X	X	X	X	Yes	Suspected
American Goldfinch	<i>Carduelis tristis</i>	CATR1	C	A	C	O	X	X	X	X	X	Yes	Confirmed
Cassin's Finch	<i>Carpodacus cassinii</i>	CACA2	R							X		Yes	
House Finch	<i>Carpodacus mexicanus</i>	CAME2	A	A	A	U	X	X	X	X	X		Confirmed
OLD WORLD SPARROWS			PASSERIDAE										
House Sparrow	<i>Passer domesticus</i>	PADO1	C	C	C	C	X	X		X			Confirmed

Definitions

Seasons

Sp = Spring
Su = Summer
Fa = Fall
Wi = Winter

Habitats

G = Grassland
D = Disturbed
T = Tall Upland Shrubland
R = Riparian Shrubland
W = Woodland
M = Marshland
X = Present

Relative Abundance

(In appropriate habitat for species)
A = Abundant
C = Common
U = Uncommon
O = Occasional
R = Rare at the Site

Note: Taxonomic organization of table follows "Colorado Birds: A reference to their distribution and habitat," A

(1) Neotropical Migrants are a migratory bird group of concern due to significant population declines over

(2) A Colorado Species of Special Concern

(3) Federal special-concern species

(4) Federal threatened or endangered species

(5) State threatened species

* New Species in 2000.

Table 3-22. Migratory bird relative abundance in spring (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	10	Red-winged Blackbird	AGPH1	6	18	0.3333	319	1.88	1273	0.2506
2000	20	Red-winged Blackbird	AGPH1	11	75	0.1467	319	3.45	1273	0.2506
2000	30	Red-winged Blackbird	AGPH1	204	120	1.7000	319	63.95	1273	0.2506
2000	93	Red-winged Blackbird	AGPH1	6	23	0.2609	319	1.88	1273	0.2506
2000	110	Red-winged Blackbird	AGPH1	44	341	0.1290	319	13.79	1273	0.2506
2000	211	Red-winged Blackbird	AGPH1	6	28	0.2143	319	1.88	1273	0.2506
2000	212	Red-winged Blackbird	AGPH1	19	103	0.1845	319	5.96	1273	0.2506
2000	230	Red-winged Blackbird	AGPH1	20	184	0.1087	319	6.27	1273	0.2506
2000	323	Red-winged Blackbird	AGPH1	1	112	0.0089	319	0.31	1273	0.2506
2000	540	Red-winged Blackbird	AGPH1	2	12	0.1667	319	0.63	1273	0.2506
2000	20	Western Meadowlark	STNE1	13	75	0.1733	227	5.73	1273	0.1783
2000	30	Western Meadowlark	STNE1	12	120	0.1000	227	5.29	1273	0.1783
2000	110	Western Meadowlark	STNE1	48	341	0.1408	227	21.15	1273	0.1783
2000	211	Western Meadowlark	STNE1	12	28	0.4286	227	5.29	1273	0.1783
2000	212	Western Meadowlark	STNE1	14	103	0.1359	227	6.17	1273	0.1783
2000	230	Western Meadowlark	STNE1	25	184	0.1359	227	11.01	1273	0.1783
2000	322	Western Meadowlark	STNE1	48	146	0.3288	227	21.15	1273	0.1783
2000	323	Western Meadowlark	STNE1	52	112	0.4643	227	22.91	1273	0.1783
2000	540	Western Meadowlark	STNE1	3	12	0.2500	227	1.32	1273	0.1783
2000	30	European Starling	STVU1	5	120	0.0417	184	2.72	1273	0.1445
2000	110	European Starling	STVU1	139	341	0.4076	184	75.54	1273	0.1445
2000	212	European Starling	STVU1	12	103	0.1165	184	6.52	1273	0.1445
2000	322	European Starling	STVU1	28	146	0.1918	184	15.22	1273	0.1445
2000	10	Vesper Sparrow	POGR1	4	18	0.2222	139	2.88	1273	0.1092
2000	20	Vesper Sparrow	POGR1	3	75	0.0400	139	2.16	1273	0.1092
2000	30	Vesper Sparrow	POGR1	7	120	0.0583	139	5.04	1273	0.1092
2000	110	Vesper Sparrow	POGR1	19	341	0.0557	139	13.67	1273	0.1092
2000	211	Vesper Sparrow	POGR1	3	28	0.1071	139	2.16	1273	0.1092
2000	212	Vesper Sparrow	POGR1	19	103	0.1845	139	13.67	1273	0.1092
2000	230	Vesper Sparrow	POGR1	11	184	0.0598	139	7.91	1273	0.1092
2000	322	Vesper Sparrow	POGR1	16	146	0.1096	139	11.51	1273	0.1092
2000	323	Vesper Sparrow	POGR1	45	112	0.4018	139	32.37	1273	0.1092
2000	540	Vesper Sparrow	POGR1	12	12	1.0000	139	8.63	1273	0.1092
2000	54	Cliff Swallow	HIPY1	71	107	0.6636	136	52.21	1273	0.1068
2000	212	Cliff Swallow	HIPY1	35	103	0.3398	136	25.74	1273	0.1068

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	322	Cliff Swallow	HIPY1	2	146	0.0137	136	1.47	1273	0.1068
2000	540	Cliff Swallow	HIPY1	28	12	2.3333	136	20.59	1273	0.1068
2000	20	Barn Swallow	HIRU1	4	75	0.0533	96	4.17	1273	0.0754
2000	30	Barn Swallow	HIRU1	5	120	0.0417	96	5.21	1273	0.0754
2000	50	Barn Swallow	HIRU1	3	1	3.0000	96	3.13	1273	0.0754
2000	54	Barn Swallow	HIRU1	40	107	0.3738	96	41.67	1273	0.0754
2000	110	Barn Swallow	HIRU1	5	341	0.0147	96	5.21	1273	0.0754
2000	212	Barn Swallow	HIRU1	26	103	0.2524	96	27.08	1273	0.0754
2000	322	Barn Swallow	HIRU1	5	146	0.0342	96	5.21	1273	0.0754
2000	540	Barn Swallow	HIRU1	8	12	0.6667	96	8.33	1273	0.0754
2000	10	House Finch	CAME2	1	18	0.0556	76	1.32	1273	0.0597
2000	20	Song Sparrow	MEME2	6	75	0.0800	76	7.89	1273	0.0597
2000	30	House Finch	CAME2	2	120	0.0167	76	2.63	1273	0.0597
2000	30	Song Sparrow	MEME2	21	120	0.1750	76	27.63	1273	0.0597
2000	93	Song Sparrow	MEME2	4	23	0.1739	76	5.26	1273	0.0597
2000	110	House Finch	CAME2	45	341	0.1320	76	59.21	1273	0.0597
2000	110	Song Sparrow	MEME2	19	341	0.0557	76	25.00	1273	0.0597
2000	212	House Finch	CAME2	11	103	0.1068	76	14.47	1273	0.0597
2000	212	Song Sparrow	MEME2	5	103	0.0485	76	6.58	1273	0.0597
2000	230	House Finch	CAME2	11	184	0.0598	76	14.47	1273	0.0597
2000	230	Song Sparrow	MEME2	21	184	0.1141	76	27.63	1273	0.0597
2000	322	House Finch	CAME2	6	146	0.0411	76	7.89	1273	0.0597
2000	10	Mourning Dove	ZEMA1	1	18	0.0556	60	1.67	1273	0.0471
2000	20	Mourning Dove	ZEMA1	4	75	0.0533	60	6.67	1273	0.0471
2000	30	Mourning Dove	ZEMA1	1	120	0.0083	60	1.67	1273	0.0471
2000	110	Mourning Dove	ZEMA1	45	341	0.1320	60	75.00	1273	0.0471
2000	211	Mourning Dove	ZEMA1	3	28	0.1071	60	5.00	1273	0.0471
2000	212	Mourning Dove	ZEMA1	5	103	0.0485	60	8.33	1273	0.0471
2000	230	Mourning Dove	ZEMA1	1	184	0.0054	60	1.67	1273	0.0471
2000	20	Black-billed Magpie	PIPI1	1	75	0.0133	59	1.69	1273	0.0463
2000	30	Black-billed Magpie	PIPI1	4	120	0.0333	59	6.78	1273	0.0463
2000	110	Black-billed Magpie	PIPI1	24	341	0.0704	59	40.68	1273	0.0463
2000	212	Black-billed Magpie	PIPI1	9	103	0.0874	59	15.25	1273	0.0463
2000	230	Black-billed Magpie	PIPI1	21	184	0.1141	59	35.59	1273	0.0463

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	30	Tree Swallow	TABI1	3	120	0.0250	45	6.67	1273	0.0353
2000	54	Tree Swallow	TABI1	11	107	0.1028	45	24.44	1273	0.0353
2000	110	American Goldfinch	CATR1	29	341	0.0850	45	64.44	1273	0.0353
2000	211	American Goldfinch	CATR1	4	28	0.1429	45	8.89	1273	0.0353
2000	212	American Goldfinch	CATR1	1	103	0.0097	45	2.22	1273	0.0353
2000	212	Tree Swallow	TABI1	20	103	0.1942	45	44.44	1273	0.0353
2000	230	American Goldfinch	CATR1	11	184	0.0598	45	24.44	1273	0.0353
2000	540	Tree Swallow	TABI1	11	12	0.9167	45	24.44	1273	0.0353
2000	30	Yellow-headed Blackbird	XAXA1	37	120	0.3083	39	94.87	1273	0.0306
2000	110	Yellow-headed Blackbird	XAXA1	2	341	0.0059	39	5.13	1273	0.0306
2000	230	Rufous-sided Towhee	PIER1	37	184	0.2011	37	100.00	1273	0.0291
2000	110	Northern Oriole	ICGA1	20	341	0.0587	30	66.67	1273	0.0236
2000	212	Northern Oriole	ICGA1	4	103	0.0388	30	13.33	1273	0.0236
2000	230	Northern Oriole	ICGA1	6	184	0.0326	30	20.00	1273	0.0236
2000	30	Brown-headed Cowbird	MOAT1	1	120	0.0083	26	3.85	1273	0.0204
2000	110	Brown-headed Cowbird	MOAT1	13	341	0.0381	26	50.00	1273	0.0204
2000	110	American Robin	TUMI1	20	341	0.0587	26	76.92	1273	0.0204
2000	211	Brown-headed Cowbird	MOAT1	3	28	0.1071	26	11.54	1273	0.0204
2000	212	Brown-headed Cowbird	MOAT1	2	103	0.0194	26	7.69	1273	0.0204
2000	212	American Robin	TUMI1	2	103	0.0194	26	7.69	1273	0.0204
2000	230	Brown-headed Cowbird	MOAT1	7	184	0.0380	26	26.92	1273	0.0204
2000	230	American Robin	TUMI1	3	184	0.0163	26	11.54	1273	0.0204
2000	322	American Robin	TUMI1	1	146	0.0068	26	3.85	1273	0.0204
2000	20	Grasshopper Sparrow	AMSA1	2	75	0.0267	22	9.09	1273	0.0173
2000	110	Grasshopper Sparrow	AMSA1	7	341	0.0205	22	31.82	1273	0.0173
2000	211	Grasshopper Sparrow	AMSA1	1	28	0.0357	22	-4.55	1273	0.0173
2000	322	Grasshopper Sparrow	AMSA1	5	146	0.0342	22	22.73	1273	0.0173
2000	323	Grasshopper Sparrow	AMSA1	7	112	0.0625	22	31.82	1273	0.0173
2000	30	Common Yellowthroat	GETR1	10	120	0.0833	20	50.00	1273	0.0157
2000	110	Common Yellowthroat	GETR1	5	341	0.0147	20	25.00	1273	0.0157
2000	212	Common Yellowthroat	GETR1	1	103	0.0097	20	5.00	1273	0.0157
2000	230	Common Yellowthroat	GETR1	4	184	0.0217	20	20.00	1273	0.0157
2000	93	Brewer's Blackbird	EUCY1	3	23	0.1304	17	17.65	1273	0.0134
2000	110	Brewer's Blackbird	EUCY1	10	341	0.0293	17	58.82	1273	0.0134
2000	212	Brewer's Blackbird	EUCY1	4	103	0.0388	17	23.53	1273	0.0134

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	110	Yellow Warbler	DEPE1	16	341	0.0469	16	100.00	1273	0.0126
2000	110	White-crowned Sparrow	ZOLE1	6	341	0.0176	12	50.00	1273	0.0094
2000	211	White-crowned Sparrow	ZOLE1	2	28	0.0714	12	16.67	1273	0.0094
2000	212	White-crowned Sparrow	ZOLE1	4	103	0.0388	12	33.33	1273	0.0094
2000	110	Northern Flicker	COAU1	11	341	0.0323	11	100.00	1273	0.0086
2000	110	Yellow-rumped Warbler	DECO1	9	341	0.0264	9	100.00	1273	0.0071
2000	212	Green-tailed Towhee	PICH1	1	103	0.0097	8	12.50	1273	0.0063
2000	230	Green-tailed Towhee	PICH1	7	184	0.0380	8	87.50	1273	0.0063
2000	230	Black-capped Chickadee	PAAT1	6	184	0.0326	6	100.00	1273	0.0047
2000	110	Say's Phoebe	SASA1	2	341	0.0059	5	40.00	1273	0.0039
2000	322	Say's Phoebe	SASA1	2	146	0.0137	5	40.00	1273	0.0039
2000	540	Say's Phoebe	SASA1	1	12	0.0833	5	20.00	1273	0.0039
2000	110	Western Bluebird	SIME1	4	341	0.0117	4	100.00	1273	0.0031
2000	323	Horned Lark	ERAL1	4	112	0.0357	4	100.00	1273	0.0031
2000	110	Blue Grosbeak	GUCA1	3	341	0.0088	3	100.00	1273	0.0024
2000	110	Eastern Kingbird	TYTY1	1	341	0.0029	3	33.33	1273	0.0024
2000	110	Western Kingbird	TYVE1	1	341	0.0029	3	33.33	1273	0.0024
2000	212	Western Kingbird	TYVE1	2	103	0.0194	3	66.67	1273	0.0024
2000	230	Eastern Kingbird	TYTY1	2	184	0.0109	3	66.67	1273	0.0024
2000	54	Violet-green Swallow	TATH1	2	107	0.0187	2	100.00	1273	0.0016
2000	110	House Wren	TRAE1	2	341	0.0059	2	100.00	1273	0.0016
2000	230	Blue-gray Gnatcatcher	POCA2	2	184	0.0109	2	100.00	1273	0.0016
2000	230	Broad-tailed Hummingbird	SEPL1	1	184	0.0054	2	50.00	1273	0.0016
2000	230	American Tree Sparrow	SPAR1	2	184	0.0109	2	100.00	1273	0.0016
2000	323	Broad-tailed Hummingbird	SEPL1	1	112	0.0089	2	50.00	1273	0.0016
2000	110	Mountain Bluebird	SICU1	1	341	0.0029	1	100.00	1273	0.0008
2000	212	Loggerhead Shrike	LALU1	1	103	0.0097	1	100.00	1273	0.0008
2000	230	Yellow-breasted Chat	ICVI1	1	184	0.0054	1	100.00	1273	0.0008
1999	10	Red-winged Blackbird	AGPH1	9	37	0.2432	310	2.90	1302	0.2381
1999	20	Red-winged Blackbird	AGPH1	36	104	0.3462	310	11.61	1302	0.2381
1999	30	Red-winged Blackbird	AGPH1	183	107	1.7103	310	59.03	1302	0.2381
1999	93	Red-winged Blackbird	AGPH1	1	6	0.1667	310	0.32	1302	0.2381
1999	110	Red-winged Blackbird	AGPH1	45	301	0.1495	310	14.52	1302	0.2381
1999	211	Red-winged Blackbird	AGPH1	5	26	0.1923	310	1.61	1302	0.2381

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	212	Red-winged Blackbird	AGPH1	27	105	0.2571	310	8.71	1302	0.2381
1999	230	Red-winged Blackbird	AGPH1	4	147	0.0272	310	1.29	1302	0.2381
1999	10	Western Meadowlark	STNE1	9	37	0.2432	261	3.45	1302	0.2005
1999	20	Western Meadowlark	STNE1	12	104	0.1154	261	4.60	1302	0.2005
1999	30	Western Meadowlark	STNE1	16	107	0.1495	261	6.13	1302	0.2005
1999	110	Western Meadowlark	STNE1	39	301	0.1296	261	14.94	1302	0.2005
1999	211	Western Meadowlark	STNE1	11	26	0.4231	261	4.21	1302	0.2005
1999	212	Western Meadowlark	STNE1	13	105	0.1238	261	4.98	1302	0.2005
1999	230	Western Meadowlark	STNE1	29	147	0.1973	261	11.11	1302	0.2005
1999	322	Western Meadowlark	STNE1	64	181	0.3536	261	24.52	1302	0.2005
1999	323	Western Meadowlark	STNE1	62	139	0.4460	261	23.75	1302	0.2005
1999	324	Western Meadowlark	STNE1	4	25	0.1600	261	1.53	1302	0.2005
1999	420	Western Meadowlark	STNE1	2	6	0.3333	261	0.77	1302	0.2005
1999	10	Vesper Sparrow	POGR1	1	37	0.0270	152	0.66	1302	0.1167
1999	20	Vesper Sparrow	POGR1	5	104	0.0481	152	3.29	1302	0.1167
1999	110	Vesper Sparrow	POGR1	12	301	0.0399	152	7.89	1302	0.1167
1999	211	Vesper Sparrow	POGR1	2	26	0.0769	152	1.32	1302	0.1167
1999	212	Vesper Sparrow	POGR1	1	105	0.0095	152	0.66	1302	0.1167
1999	230	Vesper Sparrow	POGR1	23	147	0.1565	152	15.13	1302	0.1167
1999	322	Vesper Sparrow	POGR1	41	181	0.2265	152	26.97	1302	0.1167
1999	323	Vesper Sparrow	POGR1	52	139	0.3741	152	34.21	1302	0.1167
1999	324	Vesper Sparrow	POGR1	12	25	0.4800	152	7.89	1302	0.1167
1999	540	Vesper Sparrow	POGR1	3	2	1.5000	152	1.97	1302	0.1167
1999	30	European Starling	STVU1	5	107	0.0467	79	6.33	1302	0.0607
1999	110	European Starling	STVU1	57	301	0.1894	79	72.15	1302	0.0607
1999	322	European Starling	STVU1	13	181	0.0718	79	16.46	1302	0.0607
1999	324	European Starling	STVU1	4	25	0.1600	79	5.06	1302	0.0607
1999	10	Song Sparrow	MEME2	1	37	0.0270	78	1.28	1302	0.0599
1999	20	Song Sparrow	MEME2	8	104	0.0769	78	10.26	1302	0.0599
1999	30	Song Sparrow	MEME2	15	107	0.1402	78	19.23	1302	0.0599
1999	54	Song Sparrow	MEME2	1	112	0.0089	78	1.28	1302	0.0599
1999	110	Song Sparrow	MEME2	17	301	0.0565	78	21.79	1302	0.0599
1999	212	Song Sparrow	MEME2	6	105	0.0571	78	7.69	1302	0.0599
1999	230	Song Sparrow	MEME2	30	147	0.2041	78	38.46	1302	0.0599

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	20	American Robin	TUMI1	1	104	0.0096	57	1.75	1302	0.0438
1999	110	American Robin	TUMI1	27	301	0.0897	57	47.37	1302	0.0438
1999	212	American Robin	TUMI1	17	105	0.1619	57	29.82	1302	0.0438
1999	230	American Robin	TUMI1	9	147	0.0612	57	15.79	1302	0.0438
1999	322	American Robin	TUMI1	1	181	0.0055	57	1.75	1302	0.0438
1999	324	American Robin	TUMI1	2	25	0.0800	57	3.51	1302	0.0438
1999	30	Barn Swallow	HIRU1	15	107	0.1402	54	27.78	1302	0.0415
1999	54	Barn Swallow	HIRU1	5	112	0.0446	54	9.26	1302	0.0415
1999	110	Barn Swallow	HIRU1	23	301	0.0764	54	42.59	1302	0.0415
1999	212	Barn Swallow	HIRU1	3	105	0.0286	54	5.56	1302	0.0415
1999	322	Barn Swallow	HIRU1	6	181	0.0331	54	11.11	1302	0.0415
1999	324	Barn Swallow	HIRU1	1	25	0.0400	54	1.85	1302	0.0415
1999	540	Barn Swallow	HIRU1	1	2	0.5000	54	1.85	1302	0.0415
1999	110	House Finch	CAME2	22	301	0.0731	49	44.90	1302	0.0376
1999	212	House Finch	CAME2	2	105	0.0190	49	4.08	1302	0.0376
1999	230	House Finch	CAME2	5	147	0.0340	49	10.20	1302	0.0376
1999	322	House Finch	CAME2	4	181	0.0221	49	8.16	1302	0.0376
1999	323	House Finch	CAME2	2	139	0.0144	49	4.08	1302	0.0376
1999	324	House Finch	CAME2	14	25	0.5600	49	28.57	1302	0.0376
1999	10	Mourning Dove	ZEMA1	2	37	0.0541	43	4.65	1302	0.0330
1999	20	Mourning Dove	ZEMA1	1	104	0.0096	43	2.33	1302	0.0330
1999	30	Mourning Dove	ZEMA1	4	107	0.0374	43	9.30	1302	0.0330
1999	110	Mourning Dove	ZEMA1	28	301	0.0930	43	65.12	1302	0.0330
1999	212	Mourning Dove	ZEMA1	4	105	0.0381	43	9.30	1302	0.0330
1999	322	Mourning Dove	ZEMA1	1	181	0.0055	43	2.33	1302	0.0330
1999	323	Mourning Dove	ZEMA1	3	139	0.0216	43	6.98	1302	0.0330
1999	110	White-crowned Sparrow	ZOLE1	16	301	0.0532	42	38.10	1302	0.0323
1999	212	White-crowned Sparrow	ZOLE1	1	105	0.0095	42	2.38	1302	0.0323
1999	230	White-crowned Sparrow	ZOLE1	24	147	0.1633	42	57.14	1302	0.0323
1999	322	White-crowned Sparrow	ZOLE1	1	181	0.0055	42	2.38	1302	0.0323
1999	30	Yellow-headed Blackbird	XAXA1	32	107	0.2991	32	100.00	1302	0.0246
1999	30	Rufous-sided Towhee	PIER1	1	107	0.0093	31	3.23	1302	0.0238
1999	110	Rufous-sided Towhee	PIER1	2	301	0.0066	31	6.45	1302	0.0238
1999	230	Rufous-sided Towhee	PIER1	28	147	0.1905	31	90.32	1302	0.0238

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	10	Black-billed Magpie	PIPI1	2	37	0.0541	29	6.90	1302	0.0223
1999	20	Black-billed Magpie	PIPI1	2	104	0.0192	29	6.90	1302	0.0223
1999	110	Black-billed Magpie	PIPI1	11	301	0.0365	29	37.93	1302	0.0223
1999	212	Black-billed Magpie	PIPI1	2	105	0.0190	29	6.90	1302	0.0223
1999	230	Black-billed Magpie	PIPI1	12	147	0.0816	29	41.38	1302	0.0223
1999	110	Yellow-rumped Warbler	DECO1	17	301	0.0565	24	70.83	1302	0.0184
1999	212	Yellow-rumped Warbler	DECO1	7	105	0.0667	24	29.17	1302	0.0184
1999	110	Northern Oriole	ICGA1	13	301	0.0432	21	61.90	1302	0.0161
1999	212	Northern Oriole	ICGA1	2	105	0.0190	21	9.52	1302	0.0161
1999	230	Northern Oriole	ICGA1	6	147	0.0408	21	28.57	1302	0.0161
1999	20	Common Yellowthroat	GETR1	1	104	0.0096	20	5.00	1302	0.0154
1999	30	Common Yellowthroat	GETR1	12	107	0.1121	20	60.00	1302	0.0154
1999	110	Common Yellowthroat	GETR1	3	301	0.0100	20	15.00	1302	0.0154
1999	110	Brown-headed Cowbird	MOAT1	18	301	0.0598	20	90.00	1302	0.0154
1999	211	Common Yellowthroat	GETR1	1	26	0.0385	20	5.00	1302	0.0154
1999	212	Common Yellowthroat	GETR1	1	105	0.0095	20	5.00	1302	0.0154
1999	212	Brown-headed Cowbird	MOAT1	2	105	0.0190	20	10.00	1302	0.0154
1999	230	Common Yellowthroat	GETR1	2	147	0.0136	20	10.00	1302	0.0154
1999	30	American Goldfinch	CATR1	1	107	0.0093	18	5.56	1302	0.0138
1999	110	American Goldfinch	CATR1	10	301	0.0332	18	55.56	1302	0.0138
1999	211	American Goldfinch	CATR1	1	26	0.0385	18	5.56	1302	0.0138
1999	212	American Goldfinch	CATR1	3	105	0.0286	18	16.67	1302	0.0138
1999	230	American Goldfinch	CATR1	3	147	0.0204	18	16.67	1302	0.0138
1999	110	Yellow Warbler	DEPE1	13	301	0.0432	15	86.67	1302	0.0115
1999	230	Yellow Warbler	DEPE1	2	147	0.0136	15	13.33	1302	0.0115
1999	30	Cliff Swallow	HIPY1	6	107	0.0561	12	50.00	1302	0.0092
1999	54	Cliff Swallow	HIPY1	3	112	0.0268	12	25.00	1302	0.0092
1999	110	Cliff Swallow	HIPY1	2	301	0.0066	12	16.67	1302	0.0092
1999	322	Cliff Swallow	HIPY1	1	181	0.0055	12	8.33	1302	0.0092
1999	10	Grasshopper Sparrow	AMSA1	1	37	0.0270	10	10.00	1302	0.0077
1999	30	Grasshopper Sparrow	AMSA1	1	107	0.0093	10	10.00	1302	0.0077
1999	110	Grasshopper Sparrow	AMSA1	1	301	0.0033	10	10.00	1302	0.0077
1999	230	Grasshopper Sparrow	AMSA1	2	147	0.0136	10	20.00	1302	0.0077
1999	322	Grasshopper Sparrow	AMSA1	2	181	0.0110	10	20.00	1302	0.0077
1999	323	Grasshopper Sparrow	AMSA1	3	139	0.0216	10	30.00	1302	0.0077

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	110	Northern Flicker	COAU1	8	301	0.0266	9	88.89	1302	0.0069
1999	110	Mountain Bluebird	SICU1	7	301	0.0233	9	77.78	1302	0.0069
1999	212	Northern Flicker	COAU1	1	105	0.0095	9	11.11	1302	0.0069
1999	322	Mountain Bluebird	SICU1	2	181	0.0110	9	22.22	1302	0.0069
1999	30	Say's Phoebe	SASA1	2	107	0.0187	8	25.00	1302	0.0061
1999	110	Black-capped Chickadee	PAAT1	2	301	0.0066	8	25.00	1302	0.0061
1999	110	Say's Phoebe	SASA1	3	301	0.0100	8	37.50	1302	0.0061
1999	230	Black-capped Chickadee	PAAT1	6	147	0.0408	8	75.00	1302	0.0061
1999	230	Say's Phoebe	SASA1	1	147	0.0068	8	12.50	1302	0.0061
1999	324	Say's Phoebe	SASA1	2	25	0.0800	8	25.00	1302	0.0061
1999	110	House Wren	TRAE1	5	301	0.0166	7	71.43	1302	0.0054
1999	110	Western Kingbird	TYVE1	4	301	0.0133	7	57.14	1302	0.0054
1999	212	American Tree Sparrow	SPAR1	7	105	0.0667	7	100.00	1302	0.0054
1999	212	Western Kingbird	TYVE1	1	105	0.0095	7	14.29	1302	0.0054
1999	230	House Wren	TRAE1	2	147	0.0136	7	28.57	1302	0.0054
1999	322	Western Kingbird	TYVE1	2	181	0.0110	7	28.57	1302	0.0054
1999	110	Blue-gray Gnatcatcher	POCA2	5	301	0.0166	6	83.33	1302	0.0046
1999	212	Blue-gray Gnatcatcher	POCA2	1	105	0.0095	6	16.67	1302	0.0046
1999	322	Brewer's Sparrow	SPBR1	3	181	0.0166	5	60.00	1302	0.0038
1999	323	Brewer's Sparrow	SPBR1	2	139	0.0144	5	40.00	1302	0.0038
1999	212	Sage Thrasher	ORMO1	1	105	0.0095	4	25.00	1302	0.0031
1999	230	Sage Thrasher	ORMO1	1	147	0.0068	4	25.00	1302	0.0031
1999	230	Orange-crowned warbler	VECE1	4	147	0.0272	4	100.00	1302	0.0031
1999	322	Sage Thrasher	ORMO1	2	181	0.0110	4	50.00	1302	0.0031
1999	30	Violet-green Swallow	TATH1	3	107	0.0280	3	100.00	1302	0.0023
1999	110	Brewer's Blackbird	EUCY1	1	301	0.0033	3	33.33	1302	0.0023
1999	212	Brewer's Blackbird	EUCY1	2	105	0.0190	3	66.67	1302	0.0023
1999	230	Green-tailed Towhee	PICH1	3	147	0.0204	3	100.00	1302	0.0023
1999	323	Horned Lark	ERAL1	3	139	0.0216	3	100.00	1302	0.0023
1999	212	Gray Catbird	DUCA1	1	105	0.0095	1	100.00	1302	0.0008
1999	212	Downy Woodpecker	PIPU1	1	105	0.0095	1	100.00	1302	0.0008
1999	230	Northern mockingbird	MIPO1	1	147	0.0068	1	100.00	1302	0.0008
1999	322	Rock Wren	SAOB1	1	181	0.0055	1	100.00	1302	0.0008
1999	323	Common Raven	COCO1	1	139	0.0072	1	100.00	1302	0.0008
1999	540	Eastern Phoebe	SAPH1	1	2	0.5000	1	100.00	1302	0.0008

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	10	Western Meadowlark	STNE1	4	46	0.0870	268	1.49	1263	0.2122
1998	20	Western Meadowlark	STNE1	30	121	0.2479	268	11.19	1263	0.2122
1998	30	Western Meadowlark	STNE1	8	54	0.1481	268	2.99	1263	0.2122
1998	110	Western Meadowlark	STNE1	75	337	0.2226	268	27.99	1263	0.2122
1998	211	Western Meadowlark	STNE1	12	30	0.4000	268	4.48	1263	0.2122
1998	212	Western Meadowlark	STNE1	17	96	0.1771	268	6.34	1263	0.2122
1998	230	Western Meadowlark	STNE1	23	176	0.1307	268	8.58	1263	0.2122
1998	322	Western Meadowlark	STNE1	39	100	0.3900	268	14.55	1263	0.2122
1998	323	Western Meadowlark	STNE1	46	134	0.3433	268	17.16	1263	0.2122
1998	324	Western Meadowlark	STNE1	13	24	0.5417	268	4.85	1263	0.2122
1998	420	Western Meadowlark	STNE1	1	3	0.3333	268	0.37	1263	0.2122
1998	10	Red-winged Blackbird	AGPH1	10	46	0.2174	239	4.18	1263	0.1892
1998	20	Red-winged Blackbird	AGPH1	93	121	0.7686	239	38.91	1263	0.1892
1998	30	Red-winged Blackbird	AGPH1	69	54	1.2778	239	28.87	1263	0.1892
1998	54	Red-winged Blackbird	AGPH1	4	113	0.0354	239	1.67	1263	0.1892
1998	93	Red-winged Blackbird	AGPH1	7	21	0.3333	239	2.93	1263	0.1892
1998	110	Red-winged Blackbird	AGPH1	24	337	0.0712	239	10.04	1263	0.1892
1998	211	Red-winged Blackbird	AGPH1	2	30	0.0667	239	0.84	1263	0.1892
1998	212	Red-winged Blackbird	AGPH1	10	96	0.1042	239	4.18	1263	0.1892
1998	230	Red-winged Blackbird	AGPH1	17	176	0.0966	239	7.11	1263	0.1892
1998	322	Red-winged Blackbird	AGPH1	3	100	0.0300	239	1.26	1263	0.1892
1998	20	European Starling	STVU1	9	121	0.0744	226	3.98	1263	0.1789
1998	110	European Starling	STVU1	197	337	0.5846	226	87.17	1263	0.1789
1998	212	European Starling	STVU1	1	96	0.0104	226	0.44	1263	0.1789
1998	322	European Starling	STVU1	4	100	0.0400	226	1.77	1263	0.1789
1998	324	European Starling	STVU1	15	24	0.6250	226	6.64	1263	0.1789
1998	110	House Finch	CAME2	69	337	0.2047	110	62.73	1263	0.0871
1998	211	House Finch	CAME2	2	30	0.0667	110	1.82	1263	0.0871
1998	212	House Finch	CAME2	4	96	0.0417	110	3.64	1263	0.0871
1998	230	House Finch	CAME2	10	176	0.0568	110	9.09	1263	0.0871
1998	322	House Finch	CAME2	16	100	0.1600	110	14.55	1263	0.0871
1998	323	House Finch	CAME2	1	134	0.0075	110	0.91	1263	0.0871
1998	324	House Finch	CAME2	8	24	0.3333	110	7.27	1263	0.0871

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	10	Vesper Sparrow	POGR1	3	46	0.0652	91	3.30	1263	0.0721
1998	20	Vesper Sparrow	POGR1	7	121	0.0579	91	7.69	1263	0.0721
1998	30	Vesper Sparrow	POGR1	1	54	0.0185	91	1.10	1263	0.0721
1998	110	Vesper Sparrow	POGR1	10	337	0.0297	91	10.99	1263	0.0721
1998	211	Vesper Sparrow	POGR1	4	30	0.1333	91	4.40	1263	0.0721
1998	212	Vesper Sparrow	POGR1	3	96	0.0313	91	3.30	1263	0.0721
1998	230	Vesper Sparrow	POGR1	4	176	0.0227	91	4.40	1263	0.0721
1998	322	Vesper Sparrow	POGR1	13	100	0.1300	91	14.29	1263	0.0721
1998	323	Vesper Sparrow	POGR1	40	134	0.2985	91	43.96	1263	0.0721
1998	324	Vesper Sparrow	POGR1	5	24	0.2083	91	5.49	1263	0.0721
1998	420	Vesper Sparrow	POGR1	1	3	0.3333	91	1.10	1263	0.0721
1998	20	Song Sparrow	MEME2	13	121	0.1074	78	16.67	1263	0.0618
1998	30	Song Sparrow	MEME2	8	54	0.1481	78	10.26	1263	0.0618
1998	110	Song Sparrow	MEME2	21	337	0.0623	78	26.92	1263	0.0618
1998	211	Song Sparrow	MEME2	1	30	0.0333	78	1.28	1263	0.0618
1998	212	Song Sparrow	MEME2	5	96	0.0521	78	6.41	1263	0.0618
1998	230	Song Sparrow	MEME2	30	176	0.1705	78	38.46	1263	0.0618
1998	20	American Robin	TUMI1	3	121	0.0248	61	4.92	1263	0.0483
1998	110	American Robin	TUMI1	33	337	0.0979	61	54.10	1263	0.0483
1998	212	American Robin	TUMI1	2	96	0.0208	61	3.28	1263	0.0483
1998	230	American Robin	TUMI1	20	176	0.1136	61	32.79	1263	0.0483
1998	322	American Robin	TUMI1	1	100	0.0100	61	1.64	1263	0.0483
1998	324	American Robin	TUMI1	2	24	0.0833	61	3.28	1263	0.0483
1998	10	Mountain Bluebird	SICU1	1	46	0.0217	60	1.67	1263	0.0475
1998	110	Mountain Bluebird	SICU1	54	337	0.1602	60	90.00	1263	0.0475
1998	230	Mountain Bluebird	SICU1	5	176	0.0284	60	8.33	1263	0.0475
1998	20	Mourning Dove	ZEMA1	4	121	0.0331	48	8.33	1263	0.0380
1998	30	Mourning Dove	ZEMA1	4	54	0.0741	48	8.33	1263	0.0380
1998	110	Mourning Dove	ZEMA1	38	337	0.1128	48	79.17	1263	0.0380
1998	230	Mourning Dove	ZEMA1	1	176	0.0057	48	2.08	1263	0.0380
1998	323	Mourning Dove	ZEMA1	1	134	0.0075	48	2.08	1263	0.0380
1998	110	American Goldfinch	CATR1	18	337	0.0534	45	40.00	1263	0.0356
1998	212	American Goldfinch	CATR1	4	96	0.0417	45	8.89	1263	0.0356
1998	230	American Goldfinch	CATR1	23	176	0.1307	45	51.11	1263	0.0356
1998	230	Rufous-sided Towhee	PIER1	45	176	0.2557	45	100.00	1263	0.0356

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	10	Brown-headed Cowbird	MOAT1	3	46	0.0652	29	10.34	1263	0.0230
1998	20	Northern Oriole	ICGA1	1	121	0.0083	29	3.45	1263	0.0230
1998	20	Brown-headed Cowbird	MOAT1	1	121	0.0083	29	3.45	1263	0.0230
1998	110	Northern Oriole	ICGA1	19	337	0.0564	29	65.52	1263	0.0230
1998	110	Brown-headed Cowbird	MOAT1	5	337	0.0148	29	17.24	1263	0.0230
1998	212	Northern Oriole	ICGA1	6	96	0.0625	29	20.69	1263	0.0230
1998	230	Northern Oriole	ICGA1	3	176	0.0170	29	10.34	1263	0.0230
1998	230	Brown-headed Cowbird	MOAT1	20	176	0.1136	29	68.97	1263	0.0230
1998	20	Black-billed Magpie	PIPI1	1	121	0.0083	22	4.55	1263	0.0174
1998	110	Black-billed Magpie	PIPI1	9	337	0.0267	22	40.91	1263	0.0174
1998	230	Black-billed Magpie	PIPI1	12	176	0.0682	22	54.55	1263	0.0174
1998	110	Yellow Warbler	DEPE1	19	337	0.0564	21	90.48	1263	0.0166
1998	212	Yellow Warbler	DEPE1	1	96	0.0104	21	4.76	1263	0.0166
1998	230	Yellow Warbler	DEPE1	1	176	0.0057	21	4.76	1263	0.0166
1998	230	Cliff Swallow	HIPY1	18	176	0.1023	18	100.00	1263	0.0143
1998	54	Pied-billed Grebe	POPO1	16	113	0.1416	16	100.00	1263	0.0127
1998	10	Grasshopper Sparrow	AMSA1	1	46	0.0217	15	6.67	1263	0.0119
1998	10	Common Yellowthroat	GETR1	1	46	0.0217	15	6.67	1263	0.0119
1998	20	Grasshopper Sparrow	AMSA1	2	121	0.0165	15	13.33	1263	0.0119
1998	20	Common Yellowthroat	GETR1	3	121	0.0248	15	20.00	1263	0.0119
1998	30	Common Yellowthroat	GETR1	6	54	0.1111	15	40.00	1263	0.0119
1998	110	Common Yellowthroat	GETR1	3	337	0.0089	15	20.00	1263	0.0119
1998	211	Grasshopper Sparrow	AMSA1	1	30	0.0333	15	6.67	1263	0.0119
1998	212	Grasshopper Sparrow	AMSA1	1	96	0.0104	15	6.67	1263	0.0119
1998	230	Common Yellowthroat	GETR1	2	176	0.0114	15	13.33	1263	0.0119
1998	322	Grasshopper Sparrow	AMSA1	4	100	0.0400	15	26.67	1263	0.0119
1998	323	Grasshopper Sparrow	AMSA1	6	134	0.0448	15	40.00	1263	0.0119
1998	110	Yellow-rumped Warbler	DECO1	12	337	0.0356	14	85.71	1263	0.0111
1998	230	Yellow-rumped Warbler	DECO1	1	176	0.0057	14	7.14	1263	0.0111
1998	530	Yellow-rumped Warbler	DECO1	1	5	0.2000	14	7.14	1263	0.0111
1998	20	Barn Swallow	HIRU1	1	121	0.0083	13	7.69	1263	0.0103
1998	30	Barn Swallow	HIRU1	3	54	0.0556	13	23.08	1263	0.0103
1998	110	Barn Swallow	HIRU1	3	337	0.0089	13	23.08	1263	0.0103
1998	230	Barn Swallow	HIRU1	4	176	0.0227	13	30.77	1263	0.0103
1998	324	Barn Swallow	HIRU1	2	24	0.0833	13	15.38	1263	0.0103

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	10	Brewer's Blackbird	EUCY1	2	46	0.0435	12	16.67	1263	0.0095
1998	93	Brewer's Blackbird	EUCY1	4	21	0.1905	12	33.33	1263	0.0095
1998	110	Brewer's Blackbird	EUCY1	5	337	0.0148	12	41.67	1263	0.0095
1998	110	Black-capped Chickadee	PAAT1	3	337	0.0089	12	25.00	1263	0.0095
1998	230	Brewer's Blackbird	EUCY1	1	176	0.0057	12	8.33	1263	0.0095
1998	230	Black-capped Chickadee	PAAT1	9	176	0.0511	12	75.00	1263	0.0095
1998	110	White-crowned Sparrow	ZOLE1	6	337	0.0178	10	60.00	1263	0.0079
1998	211	White-crowned Sparrow	ZOLE1	2	30	0.0667	10	20.00	1263	0.0079
1998	230	White-crowned Sparrow	ZOLE1	2	176	0.0114	10	20.00	1263	0.0079
1998	20	Northern Flicker	COAU1	1	121	0.0083	8	12.50	1263	0.0063
1998	110	Northern Flicker	COAU1	7	337	0.0208	8	87.50	1263	0.0063
1998	110	Western Kingbird	TYVE1	8	337	0.0237	8	100.00	1263	0.0063
1998	20	Rock Dove	COLI1	7	121	0.0579	7	100.00	1263	0.0055
1998	20	Say's Phoebe	SASA1	2	121	0.0165	7	28.57	1263	0.0055
1998	30	Yellow-headed Blackbird	XAXA1	7	54	0.1296	7	100.00	1263	0.0055
1998	110	Common Raven	COCO1	1	337	0.0030	7	14.29	1263	0.0055
1998	110	Say's Phoebe	SASA1	2	337	0.0059	7	28.57	1263	0.0055
1998	212	Say's Phoebe	SASA1	1	96	0.0104	7	14.29	1263	0.0055
1998	324	Common Raven	COCO1	6	24	0.2500	7	85.71	1263	0.0055
1998	324	Say's Phoebe	SASA1	2	24	0.0833	7	28.57	1263	0.0055
1998	230	Yellow-breasted Chat	ICVI1	6	176	0.0341	6	100.00	1263	0.0048
1998	110	Blue Grosbeak	GUCA1	2	337	0.0059	5	40.00	1263	0.0040
1998	212	Blue Grosbeak	GUCA1	2	96	0.0208	5	40.00	1263	0.0040
1998	230	Blue Grosbeak	GUCA1	1	176	0.0057	5	20.00	1263	0.0040
1998	323	Horned Lark	ERAL1	5	134	0.0373	5	100.00	1263	0.0040
1998	230	Chipping Sparrow	SPPA1	4	176	0.0227	4	100.00	1263	0.0032
1998	110	Broad-tailed Hummingbird	SEPL1	2	337	0.0059	3	66.67	1263	0.0024
1998	110	American Tree Sparrow	SPAR1	2	337	0.0059	3	66.67	1263	0.0024
1998	230	Broad-tailed Hummingbird	SEPL1	1	176	0.0057	3	33.33	1263	0.0024
1998	322	American Tree Sparrow	SPAR1	1	100	0.0100	3	33.33	1263	0.0024
1998	30	Marsh Wren	CIPA1	2	54	0.0370	2	100.00	1263	0.0016
1998	110	Green-tailed Towhee	PICH1	1	337	0.0030	2	50.00	1263	0.0016
1998	230	Blue Jay	CYCR1	2	176	0.0114	2	100.00	1263	0.0016
1998	230	Green-tailed Towhee	PICH1	1	176	0.0057	2	50.00	1263	0.0016
1998	230	House Wren	TRAE1	2	176	0.0114	2	100.00	1263	0.0016

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	20	Savannah Sparrow	PASA1	1	121	0.0083	1	100.00	1263	0.0008
1998	110	Dark-eyed Junco	JUHY1	1	337	0.0030	1	100.00	1263	0.0008
1998	110	Western Bluebird	SIME1	1	337	0.0030	1	100.00	1263	0.0008
1998	110	Eastern Kingbird	TYTY1	1	337	0.0030	1	100.00	1263	0.0008
1998	212	Common Grackle	QUQU1	1	96	0.0104	1	100.00	1263	0.0008
1998	230	Chestnut-sided warbler	DEPE2	1	176	0.0057	1	100.00	1263	0.0008
1998	230	Western Tanager	PILU1	1	176	0.0057	1	100.00	1263	0.0008
1998	323	Common Nighthawk	CHMI1	1	134	0.0075	1	100.00	1263	0.0008
1998	530	Rock Wren	SAOB1	1	5	0.2000	1	100.00	1263	0.0008
1997	20	Cliff Swallow	HIPY1	11	172	0.0640	410	2.68	1580	0.2595
1997	30	Cliff Swallow	HIPY1	114	99	1.1515	410	27.80	1580	0.2595
1997	54	Cliff Swallow	HIPY1	85	150	0.5667	410	20.73	1580	0.2595
1997	93	Cliff Swallow	HIPY1	5	30	0.1667	410	1.22	1580	0.2595
1997	110	Cliff Swallow	HIPY1	1	411	0.0024	410	0.24	1580	0.2595
1997	212	Cliff Swallow	HIPY1	9	138	0.0652	410	2.20	1580	0.2595
1997	230	Cliff Swallow	HIPY1	2	208	0.0096	410	0.49	1580	0.2595
1997	322	Cliff Swallow	HIPY1	2	79	0.0253	410	0.49	1580	0.2595
1997	324	Cliff Swallow	HIPY1	23	37	0.6216	410	5.61	1580	0.2595
1997	540	Cliff Swallow	HIPY1	158	6	26.3333	410	38.54	1580	0.2595
1997	20	Red-winged Blackbird	AGPH1	86	172	0.5000	267	32.21	1580	0.1690
1997	30	Red-winged Blackbird	AGPH1	71	99	0.7172	267	26.59	1580	0.1690
1997	54	Red-winged Blackbird	AGPH1	14	150	0.0933	267	5.24	1580	0.1690
1997	93	Red-winged Blackbird	AGPH1	3	30	0.1000	267	1.12	1580	0.1690
1997	110	Red-winged Blackbird	AGPH1	28	411	0.0681	267	10.49	1580	0.1690
1997	212	Red-winged Blackbird	AGPH1	43	138	0.3116	267	16.10	1580	0.1690
1997	230	Red-winged Blackbird	AGPH1	14	208	0.0673	267	5.24	1580	0.1690
1997	322	Red-winged Blackbird	AGPH1	3	79	0.0380	267	1.12	1580	0.1690
1997	324	Red-winged Blackbird	AGPH1	2	37	0.0541	267	0.75	1580	0.1690
1997	540	Red-winged Blackbird	AGPH1	3	6	0.5000	267	1.12	1580	0.1690
1997	10	Western Meadowlark	STNE1	1	9	0.1111	234	0.43	1580	0.1481
1997	20	Western Meadowlark	STNE1	20	172	0.1163	234	8.55	1580	0.1481
1997	30	Western Meadowlark	STNE1	7	99	0.0707	234	2.99	1580	0.1481
1997	54	Western Meadowlark	STNE1	1	150	0.0067	234	0.43	1580	0.1481
1997	93	Western Meadowlark	STNE1	2	30	0.0667	234	0.85	1580	0.1481

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	110	Western Meadowlark	STNE1	81	411	0.1971	234	34.62	1580	0.1481
1997	212	Western Meadowlark	STNE1	12	138	0.0870	234	5.13	1580	0.1481
1997	230	Western Meadowlark	STNE1	25	208	0.1202	234	10.68	1580	0.1481
1997	322	Western Meadowlark	STNE1	30	79	0.3797	234	12.82	1580	0.1481
1997	323	Western Meadowlark	STNE1	44	204	0.2157	234	18.80	1580	0.1481
1997	324	Western Meadowlark	STNE1	11	37	0.2973	234	4.70	1580	0.1481
1997	20	European Starling	STVU1	1	172	0.0058	121	0.83	1580	0.0766
1997	30	European Starling	STVU1	13	99	0.1313	121	10.74	1580	0.0766
1997	93	European Starling	STVU1	2	30	0.0667	121	1.65	1580	0.0766
1997	110	European Starling	STVU1	65	411	0.1582	121	53.72	1580	0.0766
1997	212	European Starling	STVU1	32	138	0.2319	121	26.45	1580	0.0766
1997	322	European Starling	STVU1	2	79	0.0253	121	1.65	1580	0.0766
1997	324	European Starling	STVU1	6	37	0.1622	121	4.96	1580	0.0766
1997	10	House Finch	CAME2	2	9	0.2222	118	1.69	1580	0.0747
1997	20	House Finch	CAME2	2	172	0.0116	118	1.69	1580	0.0747
1997	110	House Finch	CAME2	71	411	0.1727	118	60.17	1580	0.0747
1997	212	House Finch	CAME2	6	138	0.0435	118	5.08	1580	0.0747
1997	230	House Finch	CAME2	7	208	0.0337	118	5.93	1580	0.0747
1997	322	House Finch	CAME2	4	79	0.0506	118	3.39	1580	0.0747
1997	324	House Finch	CAME2	26	37	0.7027	118	22.03	1580	0.0747
1997	20	Song Sparrow	MEME2	4	172	0.0233	96	4.17	1580	0.0608
1997	30	Song Sparrow	MEME2	20	99	0.2020	96	20.83	1580	0.0608
1997	110	Song Sparrow	MEME2	39	411	0.0949	96	40.63	1580	0.0608
1997	212	Song Sparrow	MEME2	6	138	0.0435	96	6.25	1580	0.0608
1997	230	Song Sparrow	MEME2	27	208	0.1298	96	28.13	1580	0.0608
1997	30	Barn Swallow	HIRU1	67	99	0.6768	82	81.71	1580	0.0519
1997	110	Barn Swallow	HIRU1	6	411	0.0146	82	7.32	1580	0.0519
1997	212	Barn Swallow	HIRU1	7	138	0.0507	82	8.54	1580	0.0519
1997	322	Barn Swallow	HIRU1	1	79	0.0127	82	1.22	1580	0.0519
1997	323	Barn Swallow	HIRU1	1	204	0.0049	82	1.22	1580	0.0519
1997	20	Vesper Sparrow	POGR1	11	172	0.0640	74	14.86	1580	0.0468
1997	30	Vesper Sparrow	POGR1	1	99	0.0101	74	1.35	1580	0.0468
1997	110	Vesper Sparrow	POGR1	13	411	0.0316	74	17.57	1580	0.0468
1997	211	Vesper Sparrow	POGR1	2	22	0.0909	74	2.70	1580	0.0468
1997	212	Vesper Sparrow	POGR1	1	138	0.0072	74	1.35	1580	0.0468

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	230	Vesper Sparrow	POGR1	3	208	0.0144	74	4.05	1580	0.0468
1997	322	Vesper Sparrow	POGR1	8	79	0.1013	74	10.81	1580	0.0468
1997	323	Vesper Sparrow	POGR1	28	204	0.1373	74	37.84	1580	0.0468
1997	324	Vesper Sparrow	POGR1	7	37	0.1892	74	9.46	1580	0.0468
1997	20	American Goldfinch	CATR1	2	172	0.0116	68	2.94	1580	0.0430
1997	110	American Goldfinch	CATR1	45	411	0.1095	68	66.18	1580	0.0430
1997	212	American Goldfinch	CATR1	2	138	0.0145	68	2.94	1580	0.0430
1997	230	American Goldfinch	CATR1	17	208	0.0817	68	25.00	1580	0.0430
1997	322	American Goldfinch	CATR1	2	79	0.0253	68	2.94	1580	0.0430
1997	110	American Robin	TUMI1	35	411	0.0852	50	70.00	1580	0.0316
1997	212	American Robin	TUMI1	2	138	0.0145	50	4.00	1580	0.0316
1997	230	American Robin	TUMI1	13	208	0.0625	50	26.00	1580	0.0316
1997	10	Mourning Dove	ZEMA1	1	9	0.1111	47	2.13	1580	0.0297
1997	20	Mourning Dove	ZEMA1	4	172	0.0233	47	8.51	1580	0.0297
1997	30	Mourning Dove	ZEMA1	2	99	0.0202	47	4.26	1580	0.0297
1997	110	Mourning Dove	ZEMA1	28	411	0.0681	47	59.57	1580	0.0297
1997	212	Mourning Dove	ZEMA1	6	138	0.0435	47	12.77	1580	0.0297
1997	230	Mourning Dove	ZEMA1	5	208	0.0240	47	10.64	1580	0.0297
1997	324	Mourning Dove	ZEMA1	1	37	0.0270	47	2.13	1580	0.0297
1997	20	Northern Oriole	ICGA1	1	172	0.0058	38	2.63	1580	0.0241
1997	110	Northern Oriole	ICGA1	30	411	0.0730	38	78.95	1580	0.0241
1997	230	Northern Oriole	ICGA1	7	208	0.0337	38	18.42	1580	0.0241
1997	10	Black-billed Magpie	PIPI1	1	9	0.1111	33	3.03	1580	0.0209
1997	20	Black-billed Magpie	PIPI1	3	172	0.0174	33	9.09	1580	0.0209
1997	30	Black-billed Magpie	PIPI1	1	99	0.0101	33	3.03	1580	0.0209
1997	110	Black-billed Magpie	PIPI1	17	411	0.0414	33	51.52	1580	0.0209
1997	230	Black-billed Magpie	PIPI1	10	208	0.0481	33	30.30	1580	0.0209
1997	323	Black-billed Magpie	PIPI1	1	204	0.0049	33	3.03	1580	0.0209
1997	30	Violet-green Swallow	TATH1	27	99	0.2727	29	93.10	1580	0.0184
1997	230	Violet-green Swallow	TATH1	2	208	0.0096	29	6.90	1580	0.0184
1997	110	Yellow Warbler	DEPE1	16	411	0.0389	24	66.67	1580	0.0152
1997	212	Yellow Warbler	DEPE1	3	138	0.0217	24	12.50	1580	0.0152
1997	230	Yellow Warbler	DEPE1	5	208	0.0240	24	20.83	1580	0.0152
1997	230	Rufous-sided Towhee	PIER1	24	208	0.1154	24	100.00	1580	0.0152

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	30	Yellow-headed Blackbird	XAXA1	21	99	0.2121	23	91.30	1580	0.0146
1997	212	Yellow-headed Blackbird	XAXA1	1	138	0.0072	23	4.35	1580	0.0146
1997	230	Yellow-headed Blackbird	XAXA1	1	208	0.0048	23	4.35	1580	0.0146
1997	30	White-crowned Sparrow	ZOLE1	1	99	0.0101	22	4.55	1580	0.0139
1997	110	White-crowned Sparrow	ZOLE1	19	411	0.0462	22	86.36	1580	0.0139
1997	230	White-crowned Sparrow	ZOLE1	2	208	0.0096	22	9.09	1580	0.0139
1997	20	Grasshopper Sparrow	AMSA1	9	172	0.0523	20	45.00	1580	0.0127
1997	30	Brown-headed Cowbird	MOAT1	2	99	0.0202	20	10.00	1580	0.0127
1997	110	Grasshopper Sparrow	AMSA1	2	411	0.0049	20	10.00	1580	0.0127
1997	110	Brown-headed Cowbird	MOAT1	9	411	0.0219	20	45.00	1580	0.0127
1997	212	Grasshopper Sparrow	AMSA1	1	138	0.0072	20	5.00	1580	0.0127
1997	212	Brown-headed Cowbird	MOAT1	1	138	0.0072	20	5.00	1580	0.0127
1997	230	Brown-headed Cowbird	MOAT1	7	208	0.0337	20	35.00	1580	0.0127
1997	323	Grasshopper Sparrow	AMSA1	2	204	0.0098	20	10.00	1580	0.0127
1997	324	Grasshopper Sparrow	AMSA1	6	37	0.1622	20	30.00	1580	0.0127
1997	540	Brown-headed Cowbird	MOAT1	1	6	0.1667	20	5.00	1580	0.0127
1997	20	Common Yellowthroat	GETR1	6	172	0.0349	19	31.58	1580	0.0120
1997	30	Common Yellowthroat	GETR1	5	99	0.0505	19	26.32	1580	0.0120
1997	110	Common Yellowthroat	GETR1	3	411	0.0073	19	15.79	1580	0.0120
1997	211	Common Yellowthroat	GETR1	2	22	0.0909	19	10.53	1580	0.0120
1997	212	Common Yellowthroat	GETR1	1	138	0.0072	19	5.26	1580	0.0120
1997	230	Common Yellowthroat	GETR1	2	208	0.0096	19	10.53	1580	0.0120
1997	110	Yellow-rumped Warbler	DECO1	8	411	0.0195	14	57.14	1580	0.0089
1997	110	Western Kingbird	TYVE1	8	411	0.0195	14	57.14	1580	0.0089
1997	230	Yellow-rumped Warbler	DECO1	6	208	0.0288	14	42.86	1580	0.0089
1997	322	Western Kingbird	TYVE1	6	79	0.0759	14	42.86	1580	0.0089
1997	110	Dark-eyed Junco	JUHY1	10	411	0.0243	12	83.33	1580	0.0076
1997	110	Mountain Bluebird	SICU1	8	411	0.0195	12	66.67	1580	0.0076
1997	230	Dark-eyed Junco	JUHY1	2	208	0.0096	12	16.67	1580	0.0076
1997	322	Mountain Bluebird	SICU1	3	79	0.0380	12	25.00	1580	0.0076
1997	324	Mountain Bluebird	SICU1	1	37	0.0270	12	8.33	1580	0.0076
1997	30	Tree Swallow	TABI1	10	99	0.1010	10	100.00	1580	0.0063
1997	110	Northern Flicker	COAU1	9	411	0.0219	9	100.00	1580	0.0057
1997	110	Black-capped Chickadee	PAAT1	5	411	0.0122	9	55.56	1580	0.0057
1997	230	Black-capped Chickadee	PAAT1	4	208	0.0192	9	44.44	1580	0.0057

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	93	Brewer's Blackbird	EUCY1	5	30	0.1667	8	62.50	1580	0.0051
1997	110	Brewer's Blackbird	EUCY1	3	411	0.0073	8	37.50	1580	0.0051
1997	110	Lincoln's Sparrow	MELI1	8	411	0.0195	8	100.00	1580	0.0051
1997	230	Yellow-breasted Chat	ICVI1	6	208	0.0288	6	100.00	1580	0.0038
1997	110	Common Raven	COCO1	1	411	0.0024	5	20.00	1580	0.0032
1997	110	Green-tailed Towhee	PICH1	1	411	0.0024	5	20.00	1580	0.0032
1997	230	Common Raven	COCO1	2	208	0.0096	5	40.00	1580	0.0032
1997	230	Green-tailed Towhee	PICH1	4	208	0.0192	5	80.00	1580	0.0032
1997	322	Common Raven	COCO1	2	79	0.0253	5	40.00	1580	0.0032
1997	110	Lark Bunting	CAME3	2	411	0.0049	4	50.00	1580	0.0025
1997	110	Blue Grosbeak	GUCA1	3	411	0.0073	4	75.00	1580	0.0025
1997	211	Blue Grosbeak	GUCA1	1	22	0.0455	4	25.00	1580	0.0025
1997	322	Lark Bunting	CAME3	2	79	0.0253	4	50.00	1580	0.0025
1997	110	Lesser Goldfinch	CAPS1	3	411	0.0073	3	100.00	1580	0.0019
1997	110	Western Wood-Pewee	COSO1	2	411	0.0049	3	66.67	1580	0.0019
1997	110	Say's Phoebe	SASA1	1	411	0.0024	3	33.33	1580	0.0019
1997	212	Say's Phoebe	SASA1	1	138	0.0072	3	33.33	1580	0.0019
1997	230	Western Wood-Pewee	COSO1	1	208	0.0048	3	33.33	1580	0.0019
1997	324	Say's Phoebe	SASA1	1	37	0.0270	3	33.33	1580	0.0019
1997	322	Townsend's Solitaire	MYTO1	2	79	0.0253	2	100.00	1580	0.0013
1997	110	Gray Catbird	DUCA1	1	411	0.0024	1	100.00	1580	0.0006
1997	110	Common Grackle	QUQU1	1	411	0.0024	1	100.00	1580	0.0006
1997	230	Eastern Phoebe	SAPH1	1	208	0.0048	1	100.00	1580	0.0006
1996	10	Vesper Sparrow	POGR1	7	96	0.0729	282	2.48	1726	0.1634
1996	20	Vesper Sparrow	POGR1	4	132	0.0303	282	1.42	1726	0.1634
1996	30	Vesper Sparrow	POGR1	1	91	0.0110	282	0.35	1726	0.1634
1996	110	Vesper Sparrow	POGR1	61	304	0.2007	282	21.63	1726	0.1634
1996	211	Vesper Sparrow	POGR1	16	86	0.1860	282	5.67	1726	0.1634
1996	212	Vesper Sparrow	POGR1	14	143	0.0979	282	4.96	1726	0.1634
1996	220	Vesper Sparrow	POGR1	1	7	0.1429	282	0.35	1726	0.1634
1996	230	Vesper Sparrow	POGR1	15	174	0.0862	282	5.32	1726	0.1634
1996	322	Vesper Sparrow	POGR1	21	225	0.0933	282	7.45	1726	0.1634
1996	323	Vesper Sparrow	POGR1	118	145	0.8138	282	41.84	1726	0.1634
1996	324	Vesper Sparrow	POGR1	15	53	0.2830	282	5.32	1726	0.1634

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	420	Vesper Sparrow	POGR1	4	3	1.3333	282	1.42	1726	0.1634
1996	530	Vesper Sparrow	POGR1	2	27	0.0741	282	0.71	1726	0.1634
1996	540	Vesper Sparrow	POGR1	3	12	0.2500	282	1.06	1726	0.1634
1996	10	Western Meadowlark	STNE1	8	96	0.0833	233	3.43	1726	0.1350
1996	20	Western Meadowlark	STNE1	7	132	0.0530	233	3.00	1726	0.1350
1996	30	Western Meadowlark	STNE1	10	91	0.1099	233	4.29	1726	0.1350
1996	54	Western Meadowlark	STNE1	2	181	0.0110	233	0.86	1726	0.1350
1996	110	Western Meadowlark	STNE1	44	304	0.1447	233	18.88	1726	0.1350
1996	211	Western Meadowlark	STNE1	9	86	0.1047	233	3.86	1726	0.1350
1996	212	Western Meadowlark	STNE1	7	143	0.0490	233	3.00	1726	0.1350
1996	230	Western Meadowlark	STNE1	22	174	0.1264	233	9.44	1726	0.1350
1996	322	Western Meadowlark	STNE1	42	225	0.1867	233	18.03	1726	0.1350
1996	323	Western Meadowlark	STNE1	68	145	0.4690	233	29.18	1726	0.1350
1996	324	Western Meadowlark	STNE1	13	53	0.2453	233	5.58	1726	0.1350
1996	530	Western Meadowlark	STNE1	1	27	0.0370	233	0.43	1726	0.1350
1996	10	Red-winged Blackbird	AGPH1	10	96	0.1042	224	4.46	1726	0.1298
1996	20	Red-winged Blackbird	AGPH1	45	132	0.3409	224	20.09	1726	0.1298
1996	30	Red-winged Blackbird	AGPH1	60	91	0.6593	224	26.79	1726	0.1298
1996	43	Red-winged Blackbird	AGPH1	5	10	0.5000	224	2.23	1726	0.1298
1996	54	Red-winged Blackbird	AGPH1	16	181	0.0884	224	7.14	1726	0.1298
1996	93	Red-winged Blackbird	AGPH1	10	28	0.3571	224	4.46	1726	0.1298
1996	110	Red-winged Blackbird	AGPH1	21	304	0.0691	224	9.38	1726	0.1298
1996	211	Red-winged Blackbird	AGPH1	2	86	0.0233	224	0.89	1726	0.1298
1996	212	Red-winged Blackbird	AGPH1	42	143	0.2937	224	18.75	1726	0.1298
1996	220	Red-winged Blackbird	AGPH1	2	7	0.2857	224	0.89	1726	0.1298
1996	230	Red-winged Blackbird	AGPH1	4	174	0.0230	224	1.79	1726	0.1298
1996	322	Red-winged Blackbird	AGPH1	4	225	0.0178	224	1.79	1726	0.1298
1996	323	Red-winged Blackbird	AGPH1	1	145	0.0069	224	0.45	1726	0.1298
1996	324	Red-winged Blackbird	AGPH1	1	53	0.0189	224	0.45	1726	0.1298
1996	530	Red-winged Blackbird	AGPH1	1	27	0.0370	224	0.45	1726	0.1298
1996	54	European Starling	STVU1	27	181	0.1492	214	12.62	1726	0.1240
1996	110	European Starling	STVU1	62	304	0.2039	214	28.97	1726	0.1240
1996	212	European Starling	STVU1	10	143	0.0699	214	4.67	1726	0.1240
1996	322	European Starling	STVU1	106	225	0.4711	214	49.53	1726	0.1240
1996	324	European Starling	STVU1	9	53	0.1698	214	4.21	1726	0.1240

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	20	Song Sparrow	MEME2	9	132	0.0682	101	8.91	1726	0.0585
1996	30	Song Sparrow	MEME2	18	91	0.1978	101	17.82	1726	0.0585
1996	54	Song Sparrow	MEME2	2	181	0.0110	101	1.98	1726	0.0585
1996	93	Song Sparrow	MEME2	1	28	0.0357	101	0.99	1726	0.0585
1996	110	Song Sparrow	MEME2	28	304	0.0921	101	27.72	1726	0.0585
1996	211	Song Sparrow	MEME2	5	86	0.0581	101	4.95	1726	0.0585
1996	212	Song Sparrow	MEME2	18	143	0.1259	101	17.82	1726	0.0585
1996	230	Song Sparrow	MEME2	15	174	0.0862	101	14.85	1726	0.0585
1996	322	Song Sparrow	MEME2	4	225	0.0178	101	3.96	1726	0.0585
1996	324	Song Sparrow	MEME2	1	53	0.0189	101	0.99	1726	0.0585
1996	20	House Finch	CAME2	2	132	0.0152	84	2.38	1726	0.0487
1996	54	House Finch	CAME2	3	181	0.0166	84	3.57	1726	0.0487
1996	110	House Finch	CAME2	35	304	0.1151	84	41.67	1726	0.0487
1996	211	House Finch	CAME2	3	86	0.0349	84	3.57	1726	0.0487
1996	230	House Finch	CAME2	12	174	0.0690	84	14.29	1726	0.0487
1996	322	House Finch	CAME2	14	225	0.0622	84	16.67	1726	0.0487
1996	323	House Finch	CAME2	2	145	0.0138	84	2.38	1726	0.0487
1996	324	House Finch	CAME2	10	53	0.1887	84	11.90	1726	0.0487
1996	420	House Finch	CAME2	2	3	0.6667	84	2.38	1726	0.0487
1996	540	House Finch	CAME2	1	12	0.0833	84	1.19	1726	0.0487
1996	30	Cliff Swallow	HIPY1	29	91	0.3187	69	42.03	1726	0.0400
1996	54	Cliff Swallow	HIPY1	19	181	0.1050	69	27.54	1726	0.0400
1996	110	Cliff Swallow	HIPY1	2	304	0.0066	69	2.90	1726	0.0400
1996	212	Cliff Swallow	HIPY1	3	143	0.0210	69	4.35	1726	0.0400
1996	230	Cliff Swallow	HIPY1	12	174	0.0690	69	17.39	1726	0.0400
1996	530	Cliff Swallow	HIPY1	4	27	0.1481	69	5.80	1726	0.0400
1996	10	Black-billed Magpie	PIPI1	1	96	0.0104	59	1.69	1726	0.0342
1996	20	Black-billed Magpie	PIPI1	1	132	0.0076	59	1.69	1726	0.0342
1996	110	Black-billed Magpie	PIPI1	11	304	0.0362	59	18.64	1726	0.0342
1996	230	Black-billed Magpie	PIPI1	37	174	0.2126	59	62.71	1726	0.0342
1996	322	Black-billed Magpie	PIPI1	9	225	0.0400	59	15.25	1726	0.0342
1996	110	American Goldfinch	CATR1	17	304	0.0559	46	36.96	1726	0.0267
1996	212	American Goldfinch	CATR1	16	143	0.1119	46	34.78	1726	0.0267
1996	230	American Goldfinch	CATR1	12	174	0.0690	46	26.09	1726	0.0267
1996	324	American Goldfinch	CATR1	1	53	0.0189	46	2.17	1726	0.0267

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	20	Barn Swallow	HIRU1	1	132	0.0076	43	2.33	1726	0.0249
1996	30	Barn Swallow	HIRU1	7	91	0.0769	43	16.28	1726	0.0249
1996	54	Barn Swallow	HIRU1	11	181	0.0608	43	25.58	1726	0.0249
1996	211	Barn Swallow	HIRU1	4	86	0.0465	43	9.30	1726	0.0249
1996	212	Barn Swallow	HIRU1	3	143	0.0210	43	6.98	1726	0.0249
1996	230	Barn Swallow	HIRU1	10	174	0.0575	43	23.26	1726	0.0249
1996	322	Barn Swallow	HIRU1	1	225	0.0044	43	2.33	1726	0.0249
1996	323	Barn Swallow	HIRU1	4	145	0.0276	43	9.30	1726	0.0249
1996	324	Barn Swallow	HIRU1	2	53	0.0377	43	4.65	1726	0.0249
1996	20	American Robin	TUMI1	1	132	0.0076	40	2.50	1726	0.0232
1996	110	American Robin	TUMI1	22	304	0.0724	40	55.00	1726	0.0232
1996	211	American Robin	TUMI1	1	86	0.0116	40	2.50	1726	0.0232
1996	212	American Robin	TUMI1	3	143	0.0210	40	7.50	1726	0.0232
1996	230	American Robin	TUMI1	11	174	0.0632	40	27.50	1726	0.0232
1996	322	American Robin	TUMI1	2	225	0.0089	40	5.00	1726	0.0232
1996	20	Mourning Dove	ZEMA1	3	132	0.0227	29	10.34	1726	0.0168
1996	54	Mourning Dove	ZEMA1	1	181	0.0055	29	3.45	1726	0.0168
1996	110	Mourning Dove	ZEMA1	18	304	0.0592	29	62.07	1726	0.0168
1996	212	Mourning Dove	ZEMA1	2	143	0.0140	29	6.90	1726	0.0168
1996	324	Mourning Dove	ZEMA1	1	53	0.0189	29	3.45	1726	0.0168
1996	530	Mourning Dove	ZEMA1	3	27	0.1111	29	10.34	1726	0.0168
1996	540	Mourning Dove	ZEMA1	1	12	0.0833	29	3.45	1726	0.0168
1996	30	Yellow-headed Blackbird	XAXA1	21	91	0.2308	26	80.77	1726	0.0151
1996	110	Yellow-headed Blackbird	XAXA1	4	304	0.0132	26	15.38	1726	0.0151
1996	212	Yellow-headed Blackbird	XAXA1	1	143	0.0070	26	3.85	1726	0.0151
1996	211	Rufous-sided Towhee	PIER1	1	86	0.0116	25	4.00	1726	0.0145
1996	212	Rufous-sided Towhee	PIER1	1	143	0.0070	25	4.00	1726	0.0145
1996	230	Rufous-sided Towhee	PIER1	23	174	0.1322	25	92.00	1726	0.0145
1996	110	White-crowned Sparrow	ZOLE1	14	304	0.0461	23	60.87	1726	0.0133
1996	212	White-crowned Sparrow	ZOLE1	3	143	0.0210	23	13.04	1726	0.0133
1996	230	White-crowned Sparrow	ZOLE1	6	174	0.0345	23	26.09	1726	0.0133
1996	20	Grasshopper Sparrow	AMSA1	3	132	0.0227	20	15.00	1726	0.0116
1996	110	Grasshopper Sparrow	AMSA1	1	304	0.0033	20	5.00	1726	0.0116
1996	110	Yellow Warbler	DEPE1	18	304	0.0592	20	90.00	1726	0.0116

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	211	Grasshopper Sparrow	AMSA1	2	86	0.0233	20	10.00	1726	0.0116
1996	230	Grasshopper Sparrow	AMSA1	1	174	0.0057	20	5.00	1726	0.0116
1996	230	Yellow Warbler	DEPE1	2	174	0.0115	20	10.00	1726	0.0116
1996	322	Grasshopper Sparrow	AMSA1	2	225	0.0089	20	10.00	1726	0.0116
1996	323	Grasshopper Sparrow	AMSA1	6	145	0.0414	20	30.00	1726	0.0116
1996	324	Grasshopper Sparrow	AMSA1	5	53	0.0943	20	25.00	1726	0.0116
1996	110	Black-capped Chickadee	PAAT1	1	304	0.0033	19	5.26	1726	0.0110
1996	212	Black-capped Chickadee	PAAT1	2	143	0.0140	19	10.53	1726	0.0110
1996	230	Black-capped Chickadee	PAAT1	16	174	0.0920	19	84.21	1726	0.0110
1996	110	Northern Oriole	ICGA1	13	304	0.0428	17	76.47	1726	0.0098
1996	211	Northern Oriole	ICGA1	2	86	0.0233	17	11.76	1726	0.0098
1996	212	Northern Oriole	ICGA1	2	143	0.0140	17	11.76	1726	0.0098
1996	54	Pied-billed Grebe	POPO1	15	181	0.0829	15	100.00	1726	0.0087
1996	110	Sage Thrasher	ORMO1	2	304	0.0066	15	13.33	1726	0.0087
1996	211	Sage Thrasher	ORMO1	3	86	0.0349	15	20.00	1726	0.0087
1996	212	Sage Thrasher	ORMO1	1	143	0.0070	15	6.67	1726	0.0087
1996	323	Sage Thrasher	ORMO1	9	145	0.0621	15	60.00	1726	0.0087
1996	54	Brewer's Blackbird	EUCY1	1	181	0.0055	14	7.14	1726	0.0081
1996	110	Yellow-rumped Warbler	DECO1	8	304	0.0263	14	57.14	1726	0.0081
1996	110	Brewer's Blackbird	EUCY1	8	304	0.0263	14	57.14	1726	0.0081
1996	211	Brewer's Blackbird	EUCY1	2	86	0.0233	14	14.29	1726	0.0081
1996	212	Yellow-rumped Warbler	DECO1	6	143	0.0420	14	42.86	1726	0.0081
1996	212	Brewer's Blackbird	EUCY1	2	143	0.0140	14	14.29	1726	0.0081
1996	230	Brewer's Blackbird	EUCY1	1	174	0.0057	14	7.14	1726	0.0081
1996	20	Brown-headed Cowbird	MOAT1	1	132	0.0076	12	8.33	1726	0.0070
1996	30	Say's Phoebe	SASA1	1	91	0.0110	12	8.33	1726	0.0070
1996	54	Brown-headed Cowbird	MOAT1	2	181	0.0110	12	16.67	1726	0.0070
1996	54	Say's Phoebe	SASA1	1	181	0.0055	12	8.33	1726	0.0070
1996	110	Brown-headed Cowbird	MOAT1	7	304	0.0230	12	58.33	1726	0.0070
1996	110	Say's Phoebe	SASA1	2	304	0.0066	12	16.67	1726	0.0070
1996	211	Brown-headed Cowbird	MOAT1	1	86	0.0116	12	8.33	1726	0.0070
1996	212	Say's Phoebe	SASA1	1	143	0.0070	12	8.33	1726	0.0070
1996	230	Brown-headed Cowbird	MOAT1	1	174	0.0057	12	8.33	1726	0.0070
1996	230	Say's Phoebe	SASA1	2	174	0.0115	12	16.67	1726	0.0070
1996	322	Say's Phoebe	SASA1	3	225	0.0133	12	25.00	1726	0.0070

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	324	Say's Phoebe	SASA1	1	53	0.0189	12	8.33	1726	0.0070
1996	530	Say's Phoebe	SASA1	1	27	0.0370	12	8.33	1726	0.0070
1996	20	Common Yellowthroat	GETR1	4	132	0.0303	7	57.14	1726	0.0041
1996	30	Common Yellowthroat	GETR1	2	91	0.0220	7	28.57	1726	0.0041
1996	110	Northern Flicker	COAU1	6	304	0.0197	7	85.71	1726	0.0041
1996	110	Common Yellowthroat	GETR1	1	304	0.0033	7	14.29	1726	0.0041
1996	110	Western Kingbird	TYVE1	7	304	0.0230	7	100.00	1726	0.0041
1996	230	Northern Flicker	COAU1	1	174	0.0057	7	14.29	1726	0.0041
1996	30	Common Raven	COCO1	1	91	0.0110	6	16.67	1726	0.0035
1996	54	Greater Yellowlegs	TRME1	2	181	0.0110	6	33.33	1726	0.0035
1996	93	Greater Yellowlegs	TRME1	4	28	0.1429	6	66.67	1726	0.0035
1996	110	Common Raven	COCO1	3	304	0.0099	6	50.00	1726	0.0035
1996	230	Common Raven	COCO1	1	174	0.0057	6	16.67	1726	0.0035
1996	322	Common Raven	COCO1	1	225	0.0044	6	16.67	1726	0.0035
1996	110	Green-tailed Towhee	PICH1	1	304	0.0033	5	20.00	1726	0.0029
1996	211	Green-tailed Towhee	PICH1	1	86	0.0116	5	20.00	1726	0.0029
1996	212	Green-tailed Towhee	PICH1	2	143	0.0140	5	40.00	1726	0.0029
1996	230	Green-tailed Towhee	PICH1	1	174	0.0057	5	20.00	1726	0.0029
1996	110	House Wren	TRAE1	1	304	0.0033	4	25.00	1726	0.0023
1996	120	Pine Siskin	CAPI1	4	2	2.0000	4	100.00	1726	0.0023
1996	211	Chipping Sparrow	SPPA1	3	86	0.0349	4	75.00	1726	0.0023
1996	212	Chipping Sparrow	SPPA1	1	143	0.0070	4	25.00	1726	0.0023
1996	230	Dark-eyed Junco	JUHY1	4	174	0.0230	4	100.00	1726	0.0023
1996	230	House Wren	TRAE1	1	174	0.0057	4	25.00	1726	0.0023
1996	530	House Wren	TRAE1	2	27	0.0741	4	50.00	1726	0.0023
1996	20	Loggerhead Shrike	LALU1	1	132	0.0076	3	33.33	1726	0.0017
1996	54	Violet-green Swallow	TATH1	3	181	0.0166	3	100.00	1726	0.0017
1996	211	Loggerhead Shrike	LALU1	1	86	0.0116	3	33.33	1726	0.0017
1996	230	Yellow-breasted Chat	ICVI1	3	174	0.0172	3	100.00	1726	0.0017
1996	324	Loggerhead Shrike	LALU1	1	53	0.0189	3	33.33	1726	0.0017
1996	110	Eastern Phoebe	SAPH1	1	304	0.0033	2	50.00	1726	0.0012
1996	110	Warbling Vireo	VIGI1	2	304	0.0066	2	100.00	1726	0.0012
1996	110	Wilson's Warbler	WIPU1	2	304	0.0066	2	100.00	1726	0.0012
1996	211	Blue Grosbeak	GUCA1	2	86	0.0233	2	100.00	1726	0.0012

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	230	Eastern Phoebe	SAPH1	1	174	0.0057	2	50.00	1726	0.0012
1996	212	American Tree Sparrow	SPAR1	1	143	0.0070	1	100.00	1726	0.0006
1996	212	Eastern Kingbird	TYTY1	1	143	0.0070	1	100.00	1726	0.0006
1996	322	Horned Lark	ERAL1	1	225	0.0044	1	100.00	1726	0.0006
1995	10	Red-winged Blackbird	AGPH1	6	75	0.0800	216	2.78	1786	0.1209
1995	20	Red-winged Blackbird	AGPH1	22	90	0.2444	216	10.19	1786	0.1209
1995	30	Red-winged Blackbird	AGPH1	111	163	0.6810	216	51.39	1786	0.1209
1995	54	Red-winged Blackbird	AGPH1	1	111	0.0090	216	0.46	1786	0.1209
1995	93	Red-winged Blackbird	AGPH1	2	44	0.0455	216	0.93	1786	0.1209
1995	110	Red-winged Blackbird	AGPH1	18	381	0.0472	216	8.33	1786	0.1209
1995	211	Red-winged Blackbird	AGPH1	5	55	0.0909	216	2.31	1786	0.1209
1995	212	Red-winged Blackbird	AGPH1	34	167	0.2036	216	15.74	1786	0.1209
1995	220	Red-winged Blackbird	AGPH1	1	13	0.0769	216	0.46	1786	0.1209
1995	230	Red-winged Blackbird	AGPH1	5	175	0.0286	216	2.31	1786	0.1209
1995	322	Red-winged Blackbird	AGPH1	10	284	0.0352	216	4.63	1786	0.1209
1995	530	Red-winged Blackbird	AGPH1	1	21	0.0476	216	0.46	1786	0.1209
1995	10	Western Meadowlark	STNE1	11	75	0.1467	205	5.37	1786	0.1148
1995	20	Western Meadowlark	STNE1	8	90	0.0889	205	3.90	1786	0.1148
1995	30	Western Meadowlark	STNE1	8	163	0.0491	205	3.90	1786	0.1148
1995	48	Western Meadowlark	STNE1	1	8	0.1250	205	0.49	1786	0.1148
1995	110	Western Meadowlark	STNE1	38	381	0.0997	205	18.54	1786	0.1148
1995	210	Western Meadowlark	STNE1	2	8	0.2500	205	0.98	1786	0.1148
1995	211	Western Meadowlark	STNE1	6	55	0.1091	205	2.93	1786	0.1148
1995	212	Western Meadowlark	STNE1	5	167	0.0299	205	2.44	1786	0.1148
1995	230	Western Meadowlark	STNE1	11	175	0.0629	205	5.37	1786	0.1148
1995	322	Western Meadowlark	STNE1	77	284	0.2711	205	37.56	1786	0.1148
1995	323	Western Meadowlark	STNE1	20	98	0.2041	205	9.76	1786	0.1148
1995	324	Western Meadowlark	STNE1	9	31	0.2903	205	4.39	1786	0.1148
1995	510	Western Meadowlark	STNE1	1	5	0.2000	205	0.49	1786	0.1148
1995	540	Western Meadowlark	STNE1	8	24	0.3333	205	3.90	1786	0.1148
1995	10	Cliff Swallow	HIPY1	8	75	0.1067	138	5.80	1786	0.0773
1995	54	Cliff Swallow	HIPY1	8	111	0.0721	138	5.80	1786	0.0773
1995	110	Cliff Swallow	HIPY1	3	381	0.0079	138	2.17	1786	0.0773
1995	212	Cliff Swallow	HIPY1	8	167	0.0479	138	5.80	1786	0.0773

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	230	Cliff Swallow	HIPY1	1	175	0.0057	138	0.72	1786	0.0773
1995	322	Cliff Swallow	HIPY1	108	284	0.3803	138	78.26	1786	0.0773
1995	323	Cliff Swallow	HIPY1	2	98	0.0204	138	1.45	1786	0.0773
1995	10	Vesper Sparrow	POGR1	2	75	0.0267	85	2.35	1786	0.0476
1995	20	Vesper Sparrow	POGR1	2	90	0.0222	85	2.35	1786	0.0476
1995	30	Vesper Sparrow	POGR1	1	163	0.0061	85	1.18	1786	0.0476
1995	110	Vesper Sparrow	POGR1	19	381	0.0499	85	22.35	1786	0.0476
1995	211	Vesper Sparrow	POGR1	2	55	0.0364	85	2.35	1786	0.0476
1995	212	Vesper Sparrow	POGR1	6	167	0.0359	85	7.06	1786	0.0476
1995	220	Vesper Sparrow	POGR1	1	13	0.0769	85	1.18	1786	0.0476
1995	230	Vesper Sparrow	POGR1	2	175	0.0114	85	2.35	1786	0.0476
1995	322	Vesper Sparrow	POGR1	35	284	0.1232	85	41.18	1786	0.0476
1995	323	Vesper Sparrow	POGR1	15	98	0.1531	85	17.65	1786	0.0476
1995	110	American Robin	TUMI1	35	381	0.0919	84	41.67	1786	0.0470
1995	120	American Robin	TUMI1	1	12	0.0833	84	1.19	1786	0.0470
1995	211	American Robin	TUMI1	7	55	0.1273	84	8.33	1786	0.0470
1995	212	American Robin	TUMI1	2	167	0.0120	84	2.38	1786	0.0470
1995	230	American Robin	TUMI1	3	175	0.0171	84	3.57	1786	0.0470
1995	322	American Robin	TUMI1	1	284	0.0035	84	1.19	1786	0.0470
1995	324	American Robin	TUMI1	34	31	1.0968	84	40.48	1786	0.0470
1995	510	American Robin	TUMI1	1	5	0.2000	84	1.19	1786	0.0470
1995	110	House Finch	CAME2	31	381	0.0814	63	49.21	1786	0.0353
1995	212	House Finch	CAME2	4	167	0.0240	63	6.35	1786	0.0353
1995	230	House Finch	CAME2	6	175	0.0343	63	9.52	1786	0.0353
1995	322	House Finch	CAME2	3	284	0.0106	63	4.76	1786	0.0353
1995	324	House Finch	CAME2	19	31	0.6129	63	30.16	1786	0.0353
1995	20	Song Sparrow	MEME2	1	90	0.0111	61	1.64	1786	0.0342
1995	30	Song Sparrow	MEME2	8	163	0.0491	61	13.11	1786	0.0342
1995	30	European Starling	STVU1	1	163	0.0061	61	1.64	1786	0.0342
1995	93	European Starling	STVU1	1	44	0.0227	61	1.64	1786	0.0342
1995	110	Song Sparrow	MEME2	16	381	0.0420	61	26.23	1786	0.0342
1995	110	European Starling	STVU1	52	381	0.1365	61	85.25	1786	0.0342
1995	211	Song Sparrow	MEME2	1	55	0.0182	61	1.64	1786	0.0342
1995	212	Song Sparrow	MEME2	15	167	0.0898	61	24.59	1786	0.0342
1995	230	Song Sparrow	MEME2	20	175	0.1143	61	32.79	1786	0.0342

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	322	European Starling	STVU1	3	284	0.0106	61	4.92	1786	0.0342
1995	324	European Starling	STVU1	3	31	0.0968	61	4.92	1786	0.0342
1995	520	European Starling	STVU1	1	6	0.1667	61	1.64	1786	0.0342
1995	10	Mourning Dove	ZEMA1	3	75	0.0400	45	6.67	1786	0.0252
1995	30	Mourning Dove	ZEMA1	2	163	0.0123	45	4.44	1786	0.0252
1995	110	Mourning Dove	ZEMA1	28	381	0.0735	45	62.22	1786	0.0252
1995	230	Mourning Dove	ZEMA1	2	175	0.0114	45	4.44	1786	0.0252
1995	322	Mourning Dove	ZEMA1	2	284	0.0070	45	4.44	1786	0.0252
1995	323	Mourning Dove	ZEMA1	2	98	0.0204	45	4.44	1786	0.0252
1995	510	Mourning Dove	ZEMA1	1	5	0.2000	45	2.22	1786	0.0252
1995	530	Mourning Dove	ZEMA1	2	21	0.0952	45	4.44	1786	0.0252
1995	540	Mourning Dove	ZEMA1	3	24	0.1250	45	6.67	1786	0.0252
1995	110	Black-billed Magpie	PIPI1	7	381	0.0184	32	21.88	1786	0.0179
1995	212	Black-billed Magpie	PIPI1	4	167	0.0240	32	12.50	1786	0.0179
1995	230	Black-billed Magpie	PIPI1	17	175	0.0971	32	53.13	1786	0.0179
1995	322	Black-billed Magpie	PIPI1	4	284	0.0141	32	12.50	1786	0.0179
1995	10	Yellow-rumped Warbler	DECO1	3	75	0.0400	28	10.71	1786	0.0157
1995	10	Brewer's Blackbird	EUCY1	6	75	0.0800	28	21.43	1786	0.0157
1995	30	Brewer's Blackbird	EUCY1	1	163	0.0061	28	3.57	1786	0.0157
1995	110	Yellow-rumped Warbler	DECO1	11	381	0.0289	28	39.29	1786	0.0157
1995	110	Brewer's Blackbird	EUCY1	2	381	0.0052	28	7.14	1786	0.0157
1995	211	Brewer's Blackbird	EUCY1	2	55	0.0364	28	7.14	1786	0.0157
1995	212	Yellow-rumped Warbler	DECO1	1	167	0.0060	28	3.57	1786	0.0157
1995	212	Brewer's Blackbird	EUCY1	3	167	0.0180	28	10.71	1786	0.0157
1995	230	Yellow-rumped Warbler	DECO1	13	175	0.0743	28	46.43	1786	0.0157
1995	230	Brewer's Blackbird	EUCY1	4	175	0.0229	28	14.29	1786	0.0157
1995	322	Brewer's Blackbird	EUCY1	6	284	0.0211	28	21.43	1786	0.0157
1995	324	Brewer's Blackbird	EUCY1	2	31	0.0645	28	7.14	1786	0.0157
1995	530	Brewer's Blackbird	EUCY1	2	21	0.0952	28	7.14	1786	0.0157
1995	10	Barn Swallow	HIRU1	2	75	0.0267	26	7.69	1786	0.0146
1995	30	Barn Swallow	HIRU1	5	163	0.0307	26	19.23	1786	0.0146
1995	54	Barn Swallow	HIRU1	6	111	0.0541	26	23.08	1786	0.0146
1995	110	Barn Swallow	HIRU1	7	381	0.0184	26	26.92	1786	0.0146
1995	211	Barn Swallow	HIRU1	1	55	0.0182	26	3.85	1786	0.0146
1995	322	Barn Swallow	HIRU1	5	284	0.0176	26	19.23	1786	0.0146

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	10	Northern Oriole	ICGA1	1	75	0.0133	22	4.55	1786	0.0123
1995	110	Northern Oriole	ICGA1	14	381	0.0367	22	63.64	1786	0.0123
1995	211	Northern Oriole	ICGA1	2	55	0.0364	22	9.09	1786	0.0123
1995	212	Northern Oriole	ICGA1	3	167	0.0180	22	13.64	1786	0.0123
1995	230	Northern Oriole	ICGA1	1	175	0.0057	22	4.55	1786	0.0123
1995	322	Northern Oriole	ICGA1	1	284	0.0035	22	4.55	1786	0.0123
1995	30	Yellow-headed Blackbird	XAXA1	18	163	0.1104	18	100.00	1786	0.0101
1995	10	Brown-headed Cowbird	MOAT1	3	75	0.0400	12	25.00	1786	0.0067
1995	93	Brown-headed Cowbird	MOAT1	1	44	0.0227	12	8.33	1786	0.0067
1995	110	Dark-eyed Junco	JUHY1	2	381	0.0052	12	16.67	1786	0.0067
1995	110	Brown-headed Cowbird	MOAT1	5	381	0.0131	12	41.67	1786	0.0067
1995	211	Brown-headed Cowbird	MOAT1	1	55	0.0182	12	8.33	1786	0.0067
1995	212	Dark-eyed Junco	JUHY1	2	167	0.0120	12	16.67	1786	0.0067
1995	230	Dark-eyed Junco	JUHY1	8	175	0.0457	12	66.67	1786	0.0067
1995	230	Brown-headed Cowbird	MOAT1	1	175	0.0057	12	8.33	1786	0.0067
1995	322	Brown-headed Cowbird	MOAT1	1	284	0.0035	12	8.33	1786	0.0067
1995	120	Rufous-sided Towhee	PIER1	1	12	0.0833	11	9.09	1786	0.0062
1995	230	Rufous-sided Towhee	PIER1	10	175	0.0571	11	90.91	1786	0.0062
1995	30	Say's Phoebe	SASA1	1	163	0.0061	10	10.00	1786	0.0056
1995	93	Say's Phoebe	SASA1	1	44	0.0227	10	10.00	1786	0.0056
1995	110	Northern Flicker	COAU1	10	381	0.0262	10	100.00	1786	0.0056
1995	110	Say's Phoebe	SASA1	1	381	0.0026	10	10.00	1786	0.0056
1995	322	Say's Phoebe	SASA1	3	284	0.0106	10	30.00	1786	0.0056
1995	324	Say's Phoebe	SASA1	1	31	0.0323	10	10.00	1786	0.0056
1995	520	Say's Phoebe	SASA1	1	6	0.1667	10	10.00	1786	0.0056
1995	540	Say's Phoebe	SASA1	2	24	0.0833	10	20.00	1786	0.0056
1995	30	White-crowned Sparrow	ZOLE1	4	163	0.0245	9	44.44	1786	0.0050
1995	110	Yellow Warbler	DEPE1	7	381	0.0184	9	77.78	1786	0.0050
1995	110	White-crowned Sparrow	ZOLE1	1	381	0.0026	9	11.11	1786	0.0050
1995	211	Yellow Warbler	DEPE1	1	55	0.0182	9	11.11	1786	0.0050
1995	212	Yellow Warbler	DEPE1	1	167	0.0060	9	11.11	1786	0.0050
1995	230	White-crowned Sparrow	ZOLE1	4	175	0.0229	9	44.44	1786	0.0050
1995	322	Black swift	CYNI1	9	284	0.0317	9	100.00	1786	0.0050
1995	322	Horned Lark	ERAL1	6	284	0.0211	8	75.00	1786	0.0045
1995	323	Horned Lark	ERAL1	2	98	0.0204	8	25.00	1786	0.0045

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	30	Common Yellowthroat	GETR1	1	163	0.0061	7	14.29	1786	0.0039
1995	110	American Goldfinch	CATR1	7	381	0.0184	7	100.00	1786	0.0039
1995	110	Common Yellowthroat	GETR1	3	381	0.0079	7	42.86	1786	0.0039
1995	110	Black-capped Chickadee	PAAT1	5	381	0.0131	7	71.43	1786	0.0039
1995	212	Common Yellowthroat	GETR1	2	167	0.0120	7	28.57	1786	0.0039
1995	230	Common Yellowthroat	GETR1	1	175	0.0057	7	14.29	1786	0.0039
1995	230	Black-capped Chickadee	PAAT1	2	175	0.0114	7	28.57	1786	0.0039
1995	110	Mountain Bluebird	SICU1	4	381	0.0105	6	66.67	1786	0.0034
1995	322	Mountain Bluebird	SICU1	2	284	0.0070	6	33.33	1786	0.0034
1995	110	Western Kingbird	TYVE1	3	381	0.0079	5	60.00	1786	0.0028
1995	212	Western Kingbird	TYVE1	1	167	0.0060	5	20.00	1786	0.0028
1995	322	Western Kingbird	TYVE1	1	284	0.0035	5	20.00	1786	0.0028
1995	10	Grasshopper Sparrow	AMSA1	1	75	0.0133	4	25.00	1786	0.0022
1995	30	Grasshopper Sparrow	AMSA1	1	163	0.0061	4	25.00	1786	0.0022
1995	110	Eastern Phoebe	SAPH1	4	381	0.0105	4	100.00	1786	0.0022
1995	110	Eastern Kingbird	TYTY1	3	381	0.0079	4	75.00	1786	0.0022
1995	322	Grasshopper Sparrow	AMSA1	1	284	0.0035	4	25.00	1786	0.0022
1995	322	Eastern Kingbird	TYTY1	1	284	0.0035	4	25.00	1786	0.0022
1995	323	Grasshopper Sparrow	AMSA1	1	98	0.0102	4	25.00	1786	0.0022
1995	110	Green-tailed Towhee	PICH1	2	381	0.0052	3	66.67	1786	0.0017
1995	110	Chipping Sparrow	SPPA1	2	381	0.0052	3	66.67	1786	0.0017
1995	120	Green-tailed Towhee	PICH1	1	12	0.0833	3	33.33	1786	0.0017
1995	211	Common Raven	COCO1	1	55	0.0182	3	33.33	1786	0.0017
1995	230	Chipping Sparrow	SPPA1	1	175	0.0057	3	33.33	1786	0.0017
1995	323	Common Raven	COCO1	1	98	0.0102	3	33.33	1786	0.0017
1995	324	Common Raven	COCO1	1	31	0.0323	3	33.33	1786	0.0017
1995	110	Hermit Thrush	CAGU1	1	381	0.0026	2	50.00	1786	0.0011
1995	212	Hermit Thrush	CAGU1	1	167	0.0060	2	50.00	1786	0.0011
1995	520	Rock Dove	COLI1	2	6	0.3333	2	100.00	1786	0.0011
1995	10	Tree Swallow	TABI1	1	75	0.0133	1	100.00	1786	0.0006
1995	30	Marsh Wren	CIPA1	1	163	0.0061	1	100.00	1786	0.0006
1995	110	Swainson's Thrush	CAUS1	1	381	0.0026	1	100.00	1786	0.0006
1995	110	Western Wood-Pewee	COSO1	1	381	0.0026	1	100.00	1786	0.0006

Table 3-22. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	110	House Wren	TRAE1	1	381	0.0026	1	100.00	1786	0.0006
1995	211	Savannah Sparrow	PASA1	1	55	0.0182	1	100.00	1786	0.0006
1995	211	Western Tanager	PILU1	1	55	0.0182	1	100.00	1786	0.0006
1995	212	Blue Grosbeak	GUCA1	1	167	0.0060	1	100.00	1786	0.0006
1995	212	Ruby-crowned Kinglet	RECA1	1	167	0.0060	1	100.00	1786	0.0006

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-23. Migratory bird relative abundance in summer (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	20	Red-winged Blackbird	AGPH1	80	104	0.7692	640	12.50	1296	0.4938
2000	30	Red-winged Blackbird	AGPH1	207	112	1.8482	640	32.34	1296	0.4938
2000	93	Red-winged Blackbird	AGPH1	77	35	2.2000	640	12.03	1296	0.4938
2000	110	Red-winged Blackbird	AGPH1	84	338	0.2485	640	13.13	1296	0.4938
2000	211	Red-winged Blackbird	AGPH1	1	30	0.0333	640	0.16	1296	0.4938
2000	212	Red-winged Blackbird	AGPH1	33	82	0.4024	640	5.16	1296	0.4938
2000	230	Red-winged Blackbird	AGPH1	24	199	0.1206	640	3.75	1296	0.4938
2000	322	Red-winged Blackbird	AGPH1	13	145	0.0897	640	2.03	1296	0.4938
2000	324	Red-winged Blackbird	AGPH1	120	2	60.0000	640	18.75	1296	0.4938
2000	540	Red-winged Blackbird	AGPH1	1	7	0.1429	640	0.16	1296	0.4938
2000	10	Vesper Sparrow	POGR1	3	22	0.1364	376	0.80	1296	0.2901
2000	20	Vesper Sparrow	POGR1	8	104	0.0769	376	2.13	1296	0.2901
2000	30	Vesper Sparrow	POGR1	7	112	0.0625	376	1.86	1296	0.2901
2000	110	Vesper Sparrow	POGR1	63	338	0.1864	376	16.76	1296	0.2901
2000	211	Vesper Sparrow	POGR1	7	30	0.2333	376	1.86	1296	0.2901
2000	212	Vesper Sparrow	POGR1	17	82	0.2073	376	4.52	1296	0.2901
2000	230	Vesper Sparrow	POGR1	46	199	0.2312	376	12.23	1296	0.2901
2000	322	Vesper Sparrow	POGR1	89	145	0.6138	376	23.67	1296	0.2901
2000	323	Vesper Sparrow	POGR1	115	121	0.9504	376	30.59	1296	0.2901
2000	540	Vesper Sparrow	POGR1	21	7	3.0000	376	5.59	1296	0.2901
2000	10	House Finch	CAME2	2	22	0.0909	261	0.77	1296	0.2014
2000	20	House Finch	CAME2	6	104	0.0577	261	2.30	1296	0.2014
2000	30	House Finch	CAME2	4	112	0.0357	261	1.53	1296	0.2014
2000	93	House Finch	CAME2	8	35	0.2286	261	3.07	1296	0.2014
2000	110	House Finch	CAME2	115	338	0.3402	261	44.06	1296	0.2014
2000	211	House Finch	CAME2	4	30	0.1333	261	1.53	1296	0.2014
2000	212	House Finch	CAME2	20	82	0.2439	261	7.66	1296	0.2014
2000	230	House Finch	CAME2	82	199	0.4121	261	31.42	1296	0.2014
2000	322	House Finch	CAME2	15	145	0.1034	261	5.75	1296	0.2014
2000	323	House Finch	CAME2	5	121	0.0413	261	1.92	1296	0.2014
2000	10	Western Meadowlark	STNE1	3	22	0.1364	174	1.72	1296	0.1343
2000	20	Western Meadowlark	STNE1	7	104	0.0673	174	4.02	1296	0.1343
2000	30	Western Meadowlark	STNE1	16	112	0.1429	174	9.20	1296	0.1343
2000	110	Western Meadowlark	STNE1	57	338	0.1686	174	32.76	1296	0.1343
2000	211	Western Meadowlark	STNE1	9	30	0.3000	174	5.17	1296	0.1343
2000	212	Western Meadowlark	STNE1	24	82	0.2927	174	13.79	1296	0.1343
2000	230	Western Meadowlark	STNE1	14	199	0.0704	174	8.05	1296	0.1343

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	322	Western Meadowlark	STNE1	23	145	0.1586	174	13.22	1296	0.1343
2000	323	Western Meadowlark	STNE1	20	121	0.1653	174	11.49	1296	0.1343
2000	540	Western Meadowlark	STNE1	1	7	0.1429	174	0.57	1296	0.1343
2000	10	Mourning Dove	ZEMA1	1	22	0.0455	154	0.65	1296	0.1188
2000	20	Mourning Dove	ZEMA1	5	104	0.0481	154	3.25	1296	0.1188
2000	30	Mourning Dove	ZEMA1	11	112	0.0982	154	7.14	1296	0.1188
2000	93	Mourning Dove	ZEMA1	1	35	0.0286	154	0.65	1296	0.1188
2000	110	Mourning Dove	ZEMA1	108	338	0.3195	154	70.13	1296	0.1188
2000	212	Mourning Dove	ZEMA1	12	82	0.1463	154	7.79	1296	0.1188
2000	230	Mourning Dove	ZEMA1	9	199	0.0452	154	5.84	1296	0.1188
2000	323	Mourning Dove	ZEMA1	5	121	0.0413	154	3.25	1296	0.1188
2000	540	Mourning Dove	ZEMA1	2	7	0.2857	154	1.30	1296	0.1188
2000	20	Barn Swallow	HIRU1	10	104	0.0962	151	6.62	1296	0.1165
2000	30	Barn Swallow	HIRU1	16	112	0.1429	151	10.60	1296	0.1165
2000	54	Barn Swallow	HIRU1	18	97	0.1856	151	11.92	1296	0.1165
2000	93	Barn Swallow	HIRU1	4	35	0.1143	151	2.65	1296	0.1165
2000	110	Barn Swallow	HIRU1	48	338	0.1420	151	31.79	1296	0.1165
2000	211	Barn Swallow	HIRU1	4	30	0.1333	151	2.65	1296	0.1165
2000	212	Barn Swallow	HIRU1	8	82	0.0976	151	5.30	1296	0.1165
2000	230	Barn Swallow	HIRU1	15	199	0.0754	151	9.93	1296	0.1165
2000	322	Barn Swallow	HIRU1	21	145	0.1448	151	13.91	1296	0.1165
2000	323	Barn Swallow	HIRU1	3	121	0.0248	151	1.99	1296	0.1165
2000	540	Barn Swallow	HIRU1	4	7	0.5714	151	2.65	1296	0.1165
2000	10	Cliff Swallow	HIPY1	1	22	0.0455	123	0.81	1296	0.0949
2000	20	Cliff Swallow	HIPY1	15	104	0.1442	123	12.20	1296	0.0949
2000	30	Cliff Swallow	HIPY1	6	112	0.0536	123	4.88	1296	0.0949
2000	54	Cliff Swallow	HIPY1	11	97	0.1134	123	8.94	1296	0.0949
2000	93	Cliff Swallow	HIPY1	6	35	0.1714	123	4.88	1296	0.0949
2000	110	Cliff Swallow	HIPY1	30	338	0.0888	123	24.39	1296	0.0949
2000	212	Cliff Swallow	HIPY1	4	82	0.0488	123	3.25	1296	0.0949
2000	230	Cliff Swallow	HIPY1	21	199	0.1055	123	17.07	1296	0.0949
2000	322	Cliff Swallow	HIPY1	19	145	0.1310	123	15.45	1296	0.0949
2000	323	Cliff Swallow	HIPY1	7	121	0.0579	123	5.69	1296	0.0949
2000	540	Cliff Swallow	HIPY1	3	7	0.4286	123	2.44	1296	0.0949
2000	20	American Goldfinch	CATR1	3	104	0.0288	116	2.59	1296	0.0895
2000	30	American Goldfinch	CATR1	2	112	0.0179	116	1.72	1296	0.0895
2000	110	American Goldfinch	CATR1	45	338	0.1331	116	38.79	1296	0.0895

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	211	American Goldfinch	CATR1	3	30	0.1000	116	2.59	1296	0.0895
2000	212	American Goldfinch	CATR1	2	82	0.0244	116	1.72	1296	0.0895
2000	230	American Goldfinch	CATR1	60	199	0.3015	116	51.72	1296	0.0895
2000	322	American Goldfinch	CATR1	1	145	0.0069	116	0.86	1296	0.0895
2000	20	Song Sparrow	MEME2	14	104	0.1346	89	15.73	1296	0.0687
2000	30	Song Sparrow	MEME2	17	112	0.1518	89	19.10	1296	0.0687
2000	110	Song Sparrow	MEME2	19	338	0.0562	89	21.35	1296	0.0687
2000	211	Song Sparrow	MEME2	1	30	0.0333	89	1.12	1296	0.0687
2000	212	Song Sparrow	MEME2	4	82	0.0488	89	4.49	1296	0.0687
2000	230	Song Sparrow	MEME2	34	199	0.1709	89	38.20	1296	0.0687
2000	110	European Starling	STVU1	32	338	0.0947	85	37.65	1296	0.0656
2000	212	European Starling	STVU1	2	82	0.0244	85	2.35	1296	0.0656
2000	230	European Starling	STVU1	44	199	0.2211	85	51.76	1296	0.0656
2000	322	European Starling	STVU1	7	145	0.0483	85	8.24	1296	0.0656
2000	110	Rufous-sided Towhee	PIER1	2	338	0.0059	77	2.60	1296	0.0594
2000	230	Rufous-sided Towhee	PIER1	75	199	0.3769	77	97.40	1296	0.0594
2000	20	Common Yellowthroat	GETR1	16	104	0.1538	59	27.12	1296	0.0455
2000	30	Common Yellowthroat	GETR1	29	112	0.2589	59	49.15	1296	0.0455
2000	110	Common Yellowthroat	GETR1	6	338	0.0178	59	10.17	1296	0.0455
2000	211	Common Yellowthroat	GETR1	1	30	0.0333	59	1.69	1296	0.0455
2000	212	Common Yellowthroat	GETR1	1	82	0.0122	59	1.69	1296	0.0455
2000	230	Common Yellowthroat	GETR1	6	199	0.0302	59	10.17	1296	0.0455
2000	110	American Robin	TUMI1	8	338	0.0237	49	16.33	1296	0.0378
2000	212	American Robin	TUMI1	1	82	0.0122	49	2.04	1296	0.0378
2000	230	American Robin	TUMI1	40	199	0.2010	49	81.63	1296	0.0378
2000	20	Black-billed Magpie	PIPI1	1	104	0.0096	43	2.33	1296	0.0332
2000	110	Northern Oriole	ICGA1	34	338	0.1006	43	79.07	1296	0.0332
2000	110	Black-billed Magpie	PIPI1	6	338	0.0178	43	13.95	1296	0.0332
2000	211	Northern Oriole	ICGA1	1	30	0.0333	43	2.33	1296	0.0332
2000	212	Northern Oriole	ICGA1	4	82	0.0488	43	9.30	1296	0.0332
2000	212	Black-billed Magpie	PIPI1	10	82	0.1220	43	23.26	1296	0.0332
2000	230	Northern Oriole	ICGA1	4	199	0.0201	43	9.30	1296	0.0332
2000	230	Black-billed Magpie	PIPI1	21	199	0.1055	43	48.84	1296	0.0332
2000	323	Black-billed Magpie	PIPI1	5	121	0.0413	43	11.63	1296	0.0332
2000	10	Grasshopper Sparrow	AMSA1	1	22	0.0455	32	3.13	1296	0.0247
2000	20	Grasshopper Sparrow	AMSA1	2	104	0.0192	32	6.25	1296	0.0247
2000	20	Lark Sparrow	CHGR1	7	104	0.0673	32	21.88	1296	0.0247

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	110	Grasshopper Sparrow	AMSA1	7	338	0.0207	32	21.88	1296	0.0247
2000	110	Lark Sparrow	CHGR1	3	338	0.0089	32	9.38	1296	0.0247
2000	211	Grasshopper Sparrow	AMSA1	1	30	0.0333	32	3.13	1296	0.0247
2000	212	Grasshopper Sparrow	AMSA1	1	82	0.0122	32	3.13	1296	0.0247
2000	230	Grasshopper Sparrow	AMSA1	1	199	0.0050	32	3.13	1296	0.0247
2000	230	Lark Sparrow	CHGR1	3	199	0.0151	32	9.38	1296	0.0247
2000	322	Grasshopper Sparrow	AMSA1	5	145	0.0345	32	15.63	1296	0.0247
2000	322	Lark Sparrow	CHGR1	1	145	0.0069	32	3.13	1296	0.0247
2000	323	Grasshopper Sparrow	AMSA1	14	121	0.1157	32	43.75	1296	0.0247
2000	323	Lark Sparrow	CHGR1	10	121	0.0826	32	31.25	1296	0.0247
2000	540	Lark Sparrow	CHGR1	8	7	1.1429	32	25.00	1296	0.0247
2000	110	Yellow Warbler	DEPE1	25	338	0.0740	28	89.29	1296	0.0216
2000	230	Yellow Warbler	DEPE1	3	199	0.0151	28	10.71	1296	0.0216
2000	110	Blue Grosbeak	GUCA1	13	338	0.0385	23	56.52	1296	0.0177
2000	212	Blue Grosbeak	GUCA1	4	82	0.0488	23	17.39	1296	0.0177
2000	220	Blue Grosbeak	GUCA1	1	2	0.5000	23	4.35	1296	0.0177
2000	230	Blue Grosbeak	GUCA1	3	199	0.0151	23	13.04	1296	0.0177
2000	322	Blue Grosbeak	GUCA1	1	145	0.0069	23	4.35	1296	0.0177
2000	323	Blue Grosbeak	GUCA1	1	121	0.0083	23	4.35	1296	0.0177
2000	110	Black-capped Chickadee	PAAT1	2	338	0.0059	22	9.09	1296	0.0170
2000	230	Black-capped Chickadee	PAAT1	20	199	0.1005	22	90.91	1296	0.0170
2000	20	Eastern Kingbird	TYTY1	2	104	0.0192	20	10.00	1296	0.0154
2000	110	Eastern Kingbird	TYTY1	10	338	0.0296	20	50.00	1296	0.0154
2000	211	Eastern Kingbird	TYTY1	2	30	0.0667	20	10.00	1296	0.0154
2000	212	Eastern Kingbird	TYTY1	5	82	0.0610	20	25.00	1296	0.0154
2000	230	Eastern Kingbird	TYTY1	1	199	0.0050	20	5.00	1296	0.0154
2000	20	Yellow-headed Blackbird	XAXA1	4	104	0.0385	19	21.05	1296	0.0147
2000	30	Brown-headed Cowbird	MOAT1	1	112	0.0089	19	5.26	1296	0.0147
2000	30	Yellow-headed Blackbird	XAXA1	15	112	0.1339	19	78.95	1296	0.0147
2000	110	Brown-headed Cowbird	MOAT1	10	338	0.0296	19	52.63	1296	0.0147
2000	110	House Wren	TRAE1	17	338	0.0503	19	89.47	1296	0.0147
2000	212	Brown-headed Cowbird	MOAT1	2	82	0.0244	19	10.53	1296	0.0147
2000	230	Brown-headed Cowbird	MOAT1	5	199	0.0251	19	26.32	1296	0.0147
2000	230	House Wren	TRAE1	2	199	0.0101	19	10.53	1296	0.0147
2000	323	Brown-headed Cowbird	MOAT1	1	121	0.0083	19	5.26	1296	0.0147
2000	20	Say's Phoebe	SASA1	4	104	0.0385	16	25.00	1296	0.0123
2000	30	Say's Phoebe	SASA1	1	112	0.0089	16	6.25	1296	0.0123

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	110	Say's Phoebe	SASA1	5	338	0.0148	16	31.25	1296	0.0123
2000	212	Say's Phoebe	SASA1	4	82	0.0488	16	25.00	1296	0.0123
2000	230	Say's Phoebe	SASA1	2	199	0.0101	16	12.50	1296	0.0123
2000	10	Western Kingbird	TYVE1	2	22	0.0909	15	13.33	1296	0.0116
2000	110	Yellow-breasted Chat	ICVI1	5	338	0.0148	15	33.33	1296	0.0116
2000	110	Western Kingbird	TYVE1	9	338	0.0266	15	60.00	1296	0.0116
2000	212	Western Kingbird	TYVE1	1	82	0.0122	15	6.67	1296	0.0116
2000	230	Yellow-breasted Chat	ICVI1	10	199	0.0503	15	66.67	1296	0.0116
2000	322	Western Kingbird	TYVE1	3	145	0.0207	15	20.00	1296	0.0116
2000	110	Lesser Goldfinch	CAPS1	3	338	0.0089	14	21.43	1296	0.0108
2000	211	Lesser Goldfinch	CAPS1	4	30	0.1333	14	28.57	1296	0.0108
2000	230	Lesser Goldfinch	CAPS1	7	199	0.0352	14	50.00	1296	0.0108
2000	230	Green-tailed Towhee	PICH1	11	199	0.0553	11	100.00	1296	0.0085
2000	110	Brewer's Blackbird	EUCY1	6	338	0.0178	6	100.00	1296	0.0046
2000	230	Black-headed Grosbeak	PHME1	5	199	0.0251	5	100.00	1296	0.0039
2000	110	Northern Flicker	COAU1	4	338	0.0118	4	100.00	1296	0.0031
2000	211	Broad-tailed Hummingbird	SEPL1	1	30	0.0333	3	33.33	1296	0.0023
2000	230	Broad-tailed Hummingbird	SEPL1	2	199	0.0101	3	66.67	1296	0.0023
2000	30	Wilson's Warbler	WIPU1	2	112	0.0179	2	100.00	1296	0.0015
2000	110	Eastern Phoebe	SAPH1	2	338	0.0059	2	100.00	1296	0.0015
2000	110	Eastern fox squirrel	SCNI1	2	338	0.0059	2	100.00	1296	0.0015
2000	110	Chipping Sparrow	SPPA1	1	338	0.0030	2	50.00	1296	0.0015
2000	211	Chipping Sparrow	SPPA1	1	30	0.0333	2	50.00	1296	0.0015
2000	230	Common Nighthawk	CHMI1	2	199	0.0101	2	100.00	1296	0.0015
2000	323	Horned Lark	ERAL1	2	121	0.0165	2	100.00	1296	0.0015
2000	20	Loggerhead Shrike	LALU1	1	104	0.0096	1	100.00	1296	0.0008
2000	30	Marsh Wren	CIPA1	1	112	0.0089	1	100.00	1296	0.0008
2000	110	Common Raven	COCO1	1	338	0.0030	1	100.00	1296	0.0008
1999	10	Red-winged Blackbird	AGPH1	11	59	0.1864	553	1.99	1547	0.3575
1999	20	Red-winged Blackbird	AGPH1	75	98	0.7653	553	13.56	1547	0.3575
1999	30	Red-winged Blackbird	AGPH1	192	109	1.7615	553	34.72	1547	0.3575
1999	93	Red-winged Blackbird	AGPH1	21	39	0.5385	553	3.80	1547	0.3575
1999	110	Red-winged Blackbird	AGPH1	50	411	0.1217	553	9.04	1547	0.3575
1999	211	Red-winged Blackbird	AGPH1	5	46	0.1087	553	0.90	1547	0.3575
1999	212	Red-winged Blackbird	AGPH1	97	124	0.7823	553	17.54	1547	0.3575
1999	230	Red-winged Blackbird	AGPH1	82	202	0.4059	553	14.83	1547	0.3575

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	322	Red-winged Blackbird	AGPH1	5	159	0.0314	553	0.90	1547	0.3575
1999	324	Red-winged Blackbird	AGPH1	15	23	0.6522	553	2.71	1547	0.3575
1999	10	House Finch	CAME2	5	59	0.0847	350	1.43	1547	0.2262
1999	20	House Finch	CAME2	12	98	0.1224	350	3.43	1547	0.2262
1999	30	House Finch	CAME2	8	109	0.0734	350	2.29	1547	0.2262
1999	110	House Finch	CAME2	139	411	0.3382	350	39.71	1547	0.2262
1999	120	House Finch	CAME2	2	2	1.0000	350	0.57	1547	0.2262
1999	211	House Finch	CAME2	7	46	0.1522	350	2.00	1547	0.2262
1999	212	House Finch	CAME2	39	124	0.3145	350	11.14	1547	0.2262
1999	230	House Finch	CAME2	64	202	0.3168	350	18.29	1547	0.2262
1999	322	House Finch	CAME2	19	159	0.1195	350	5.43	1547	0.2262
1999	324	House Finch	CAME2	26	23	1.1304	350	7.43	1547	0.2262
1999	420	House Finch	CAME2	10	3	3.3333	350	2.86	1547	0.2262
1999	540	House Finch	CAME2	19	5	3.8000	350	5.43	1547	0.2262
1999	10	Vesper Sparrow	POGR1	4	59	0.0678	287	1.39	1547	0.1855
1999	20	Vesper Sparrow	POGR1	19	98	0.1939	287	6.62	1547	0.1855
1999	30	Vesper Sparrow	POGR1	4	109	0.0367	287	1.39	1547	0.1855
1999	93	Vesper Sparrow	POGR1	4	39	0.1026	287	1.39	1547	0.1855
1999	110	Vesper Sparrow	POGR1	36	411	0.0876	287	12.54	1547	0.1855
1999	211	Vesper Sparrow	POGR1	18	46	0.3913	287	6.27	1547	0.1855
1999	212	Vesper Sparrow	POGR1	10	124	0.0806	287	3.48	1547	0.1855
1999	230	Vesper Sparrow	POGR1	23	202	0.1139	287	8.01	1547	0.1855
1999	322	Vesper Sparrow	POGR1	44	159	0.2767	287	15.33	1547	0.1855
1999	323	Vesper Sparrow	POGR1	103	159	0.6478	287	35.89	1547	0.1855
1999	324	Vesper Sparrow	POGR1	9	23	0.3913	287	3.14	1547	0.1855
1999	420	Vesper Sparrow	POGR1	9	3	3.0000	287	3.14	1547	0.1855
1999	540	Vesper Sparrow	POGR1	4	5	0.8000	287	1.39	1547	0.1855
1999	10	Western Meadowlark	STNE1	8	59	0.1356	261	3.07	1547	0.1687
1999	20	Western Meadowlark	STNE1	12	98	0.1224	261	4.60	1547	0.1687
1999	30	Western Meadowlark	STNE1	13	109	0.1193	261	4.98	1547	0.1687
1999	93	Western Meadowlark	STNE1	1	39	0.0256	261	0.38	1547	0.1687
1999	110	Western Meadowlark	STNE1	84	411	0.2044	261	32.18	1547	0.1687
1999	211	Western Meadowlark	STNE1	15	46	0.3261	261	5.75	1547	0.1687
1999	212	Western Meadowlark	STNE1	13	124	0.1048	261	4.98	1547	0.1687
1999	230	Western Meadowlark	STNE1	32	202	0.1584	261	12.26	1547	0.1687
1999	322	Western Meadowlark	STNE1	52	159	0.3270	261	19.92	1547	0.1687

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	323	Western Meadowlark	STNE1	27	159	0.1698	261	10.34	1547	0.1687
1999	324	Western Meadowlark	STNE1	4	23	0.1739	261	1.53	1547	0.1687
1999	10	European Starling	STVU1	2	59	0.0339	158	1.27	1547	0.1021
1999	20	European Starling	STVU1	7	98	0.0714	158	4.43	1547	0.1021
1999	110	European Starling	STVU1	138	411	0.3358	158	87.34	1547	0.1021
1999	211	European Starling	STVU1	1	46	0.0217	158	0.63	1547	0.1021
1999	212	European Starling	STVU1	4	124	0.0323	158	2.53	1547	0.1021
1999	230	European Starling	STVU1	1	202	0.0050	158	0.63	1547	0.1021
1999	322	European Starling	STVU1	2	159	0.0126	158	1.27	1547	0.1021
1999	324	European Starling	STVU1	3	23	0.1304	158	1.90	1547	0.1021
1999	20	Barn Swallow	HIRU1	8	98	0.0816	156	5.13	1547	0.1008
1999	30	Barn Swallow	HIRU1	18	109	0.1651	156	11.54	1547	0.1008
1999	54	Barn Swallow	HIRU1	4	104	0.0385	156	2.56	1547	0.1008
1999	93	Barn Swallow	HIRU1	3	39	0.0769	156	1.92	1547	0.1008
1999	110	Barn Swallow	HIRU1	34	411	0.0827	156	21.79	1547	0.1008
1999	211	Barn Swallow	HIRU1	4	46	0.0870	156	2.56	1547	0.1008
1999	212	Barn Swallow	HIRU1	38	124	0.3065	156	24.36	1547	0.1008
1999	230	Barn Swallow	HIRU1	15	202	0.0743	156	9.62	1547	0.1008
1999	322	Barn Swallow	HIRU1	19	159	0.1195	156	12.18	1547	0.1008
1999	324	Barn Swallow	HIRU1	4	23	0.1739	156	2.56	1547	0.1008
1999	420	Barn Swallow	HIRU1	5	3	1.6667	156	3.21	1547	0.1008
1999	520	Barn Swallow	HIRU1	2	1	2.0000	156	1.28	1547	0.1008
1999	540	Barn Swallow	HIRU1	2	5	0.4000	156	1.28	1547	0.1008
1999	10	American Goldfinch	CATR1	2	59	0.0339	150	1.33	1547	0.0970
1999	20	American Goldfinch	CATR1	7	98	0.0714	150	4.67	1547	0.0970
1999	110	American Goldfinch	CATR1	68	411	0.1655	150	45.33	1547	0.0970
1999	211	American Goldfinch	CATR1	1	46	0.0217	150	0.67	1547	0.0970
1999	212	American Goldfinch	CATR1	7	124	0.0565	150	4.67	1547	0.0970
1999	230	American Goldfinch	CATR1	62	202	0.3069	150	41.33	1547	0.0970
1999	323	American Goldfinch	CATR1	3	159	0.0189	150	2.00	1547	0.0970
1999	20	Mourning Dove	ZEMA1	5	98	0.0510	139	3.60	1547	0.0899
1999	30	Mourning Dove	ZEMA1	10	109	0.0917	139	7.19	1547	0.0899
1999	110	Mourning Dove	ZEMA1	98	411	0.2384	139	70.50	1547	0.0899
1999	211	Mourning Dove	ZEMA1	4	46	0.0870	139	2.88	1547	0.0899
1999	212	Mourning Dove	ZEMA1	5	124	0.0403	139	3.60	1547	0.0899
1999	230	Mourning Dove	ZEMA1	6	202	0.0297	139	4.32	1547	0.0899
1999	322	Mourning Dove	ZEMA1	1	159	0.0063	139	0.72	1547	0.0899

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	323	Mourning Dove	ZEMA1	4	159	0.0252	139	2.88	1547	0.0899
1999	324	Mourning Dove	ZEMA1	1	23	0.0435	139	0.72	1547	0.0899
1999	420	Mourning Dove	ZEMA1	1	3	0.3333	139	0.72	1547	0.0899
1999	530	Mourning Dove	ZEMA1	4	3	1.3333	139	2.88	1547	0.0899
1999	20	Northern Oriole	ICGA1	1	98	0.0102	85	1.18	1547	0.0549
1999	110	Northern Oriole	ICGA1	47	411	0.1144	85	55.29	1547	0.0549
1999	211	Northern Oriole	ICGA1	4	46	0.0870	85	4.71	1547	0.0549
1999	212	Northern Oriole	ICGA1	17	124	0.1371	85	20.00	1547	0.0549
1999	230	Northern Oriole	ICGA1	15	202	0.0743	85	17.65	1547	0.0549
1999	322	Northern Oriole	ICGA1	1	159	0.0063	85	1.18	1547	0.0549
1999	10	Song Sparrow	MEME2	2	59	0.0339	83	2.41	1547	0.0537
1999	20	Song Sparrow	MEME2	8	98	0.0816	83	9.64	1547	0.0537
1999	30	Song Sparrow	MEME2	13	109	0.1193	83	15.66	1547	0.0537
1999	110	Song Sparrow	MEME2	30	411	0.0730	83	36.14	1547	0.0537
1999	212	Song Sparrow	MEME2	3	124	0.0242	83	3.61	1547	0.0537
1999	230	Song Sparrow	MEME2	27	202	0.1337	83	32.53	1547	0.0537
1999	20	Cliff Swallow	HIPY1	1	98	0.0102	69	1.45	1547	0.0446
1999	30	Cliff Swallow	HIPY1	20	109	0.1835	69	28.99	1547	0.0446
1999	54	Cliff Swallow	HIPY1	8	104	0.0769	69	11.59	1547	0.0446
1999	93	Cliff Swallow	HIPY1	5	39	0.1282	69	7.25	1547	0.0446
1999	110	Cliff Swallow	HIPY1	10	411	0.0243	69	14.49	1547	0.0446
1999	212	Cliff Swallow	HIPY1	5	124	0.0403	69	7.25	1547	0.0446
1999	230	Cliff Swallow	HIPY1	16	202	0.0792	69	23.19	1547	0.0446
1999	323	Cliff Swallow	HIPY1	4	159	0.0252	69	5.80	1547	0.0446
1999	110	Rufous-sided Towhee	PIER1	1	411	0.0024	67	1.49	1547	0.0433
1999	230	Rufous-sided Towhee	PIER1	66	202	0.3267	67	98.51	1547	0.0433
1999	10	Common Yellowthroat	GETR1	2	59	0.0339	60	3.33	1547	0.0388
1999	20	Common Yellowthroat	GETR1	8	98	0.0816	60	13.33	1547	0.0388
1999	30	Common Yellowthroat	GETR1	20	109	0.1835	60	33.33	1547	0.0388
1999	110	Common Yellowthroat	GETR1	15	411	0.0365	60	25.00	1547	0.0388
1999	211	Common Yellowthroat	GETR1	4	46	0.0870	60	6.67	1547	0.0388
1999	212	Common Yellowthroat	GETR1	7	124	0.0565	60	11.67	1547	0.0388
1999	230	Common Yellowthroat	GETR1	4	202	0.0198	60	6.67	1547	0.0388
1999	30	American Robin	TUMI1	1	109	0.0092	48	2.08	1547	0.0310
1999	110	American Robin	TUMI1	20	411	0.0487	48	41.67	1547	0.0310
1999	120	American Robin	TUMI1	2	2	1.0000	48	4.17	1547	0.0310
1999	212	American Robin	TUMI1	1	124	0.0081	48	2.08	1547	0.0310

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	230	American Robin	TUMI1	23	202	0.1139	48	47.92	1547	0.0310
1999	322	American Robin	TUMI1	1	159	0.0063	48	2.08	1547	0.0310
1999	30	Yellow-headed Blackbird	XAXA1	44	109	0.4037	45	97.78	1547	0.0291
1999	110	Yellow-headed Blackbird	XAXA1	1	411	0.0024	45	2.22	1547	0.0291
1999	20	Brown-headed Cowbird	MOAT1	2	98	0.0204	42	4.76	1547	0.0271
1999	30	Brown-headed Cowbird	MOAT1	2	109	0.0183	42	4.76	1547	0.0271
1999	110	Brown-headed Cowbird	MOAT1	16	411	0.0389	42	38.10	1547	0.0271
1999	212	Brown-headed Cowbird	MOAT1	3	124	0.0242	42	7.14	1547	0.0271
1999	230	Brown-headed Cowbird	MOAT1	18	202	0.0891	42	42.86	1547	0.0271
1999	322	Brown-headed Cowbird	MOAT1	1	159	0.0063	42	2.38	1547	0.0271
1999	10	Black-billed Magpie	PIPI1	1	59	0.0169	40	2.50	1547	0.0259
1999	93	Black-billed Magpie	PIPI1	1	39	0.0256	40	2.50	1547	0.0259
1999	110	Yellow Warbler	DEPE1	30	411	0.0730	40	75.00	1547	0.0259
1999	110	Black-billed Magpie	PIPI1	6	411	0.0146	40	15.00	1547	0.0259
1999	212	Yellow Warbler	DEPE1	4	124	0.0323	40	10.00	1547	0.0259
1999	212	Black-billed Magpie	PIPI1	5	124	0.0403	40	12.50	1547	0.0259
1999	230	Yellow Warbler	DEPE1	6	202	0.0297	40	15.00	1547	0.0259
1999	230	Black-billed Magpie	PIPI1	24	202	0.1188	40	60.00	1547	0.0259
1999	322	Black-billed Magpie	PIPI1	2	159	0.0126	40	5.00	1547	0.0259
1999	420	Black-billed Magpie	PIPI1	1	3	0.3333	40	2.50	1547	0.0259
1999	10	Grasshopper Sparrow	AMSA1	3	59	0.0508	33	9.09	1547	0.0213
1999	30	Grasshopper Sparrow	AMSA1	3	109	0.0275	33	9.09	1547	0.0213
1999	110	Grasshopper Sparrow	AMSA1	3	411	0.0073	33	9.09	1547	0.0213
1999	211	Grasshopper Sparrow	AMSA1	2	46	0.0435	33	6.06	1547	0.0213
1999	212	Grasshopper Sparrow	AMSA1	1	124	0.0081	33	3.03	1547	0.0213
1999	322	Grasshopper Sparrow	AMSA1	12	159	0.0755	33	36.36	1547	0.0213
1999	323	Grasshopper Sparrow	AMSA1	9	159	0.0566	33	27.27	1547	0.0213
1999	30	Brewer's Blackbird	EUCY1	1	109	0.0092	31	3.23	1547	0.0200
1999	93	Brewer's Blackbird	EUCY1	2	39	0.0513	31	6.45	1547	0.0200
1999	110	Brewer's Blackbird	EUCY1	25	411	0.0608	31	80.65	1547	0.0200
1999	110	Western Kingbird	TYVE1	18	411	0.0438	31	58.06	1547	0.0200
1999	212	Brewer's Blackbird	EUCY1	2	124	0.0161	31	6.45	1547	0.0200
1999	212	Western Kingbird	TYVE1	5	124	0.0403	31	16.13	1547	0.0200
1999	230	Brewer's Blackbird	EUCY1	1	202	0.0050	31	3.23	1547	0.0200
1999	230	Western Kingbird	TYVE1	5	202	0.0248	31	16.13	1547	0.0200
1999	322	Western Kingbird	TYVE1	3	159	0.0189	31	9.68	1547	0.0200

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	30	Blue Grosbeak	GUCA1	1	109	0.0092	30	3.33	1547	0.0194
1999	110	Blue Grosbeak	GUCA1	15	411	0.0365	30	50.00	1547	0.0194
1999	211	Blue Grosbeak	GUCA1	3	46	0.0652	30	10.00	1547	0.0194
1999	212	Blue Grosbeak	GUCA1	8	124	0.0645	30	26.67	1547	0.0194
1999	230	Blue Grosbeak	GUCA1	3	202	0.0149	30	10.00	1547	0.0194
1999	110	Black-capped Chickadee	PAAT1	3	411	0.0073	20	15.00	1547	0.0129
1999	230	Black-capped Chickadee	PAAT1	17	202	0.0842	20	85.00	1547	0.0129
1999	30	Say's Phoebe	SASA1	2	109	0.0183	19	10.53	1547	0.0123
1999	110	Say's Phoebe	SASA1	9	411	0.0219	19	47.37	1547	0.0123
1999	211	Say's Phoebe	SASA1	1	46	0.0217	19	5.26	1547	0.0123
1999	212	Say's Phoebe	SASA1	2	124	0.0161	19	10.53	1547	0.0123
1999	230	Say's Phoebe	SASA1	2	202	0.0099	19	10.53	1547	0.0123
1999	324	Say's Phoebe	SASA1	2	23	0.0870	19	10.53	1547	0.0123
1999	420	Say's Phoebe	SASA1	1	3	0.3333	19	5.26	1547	0.0123
1999	93	Eastern Phoebe	SAPH1	1	39	0.0256	14	7.14	1547	0.0090
1999	110	Eastern Phoebe	SAPH1	10	411	0.0243	14	71.43	1547	0.0090
1999	230	Eastern Phoebe	SAPH1	2	202	0.0099	14	14.29	1547	0.0090
1999	323	Eastern Phoebe	SAPH1	1	159	0.0063	14	7.14	1547	0.0090
1999	110	Lesser Goldfinch	CAPS1	10	411	0.0243	12	83.33	1547	0.0078
1999	110	Yellow-breasted Chat	ICVI1	2	411	0.0049	12	16.67	1547	0.0078
1999	230	Lesser Goldfinch	CAPS1	2	202	0.0099	12	16.67	1547	0.0078
1999	230	Yellow-breasted Chat	ICVI1	10	202	0.0495	12	83.33	1547	0.0078
1999	230	Green-tailed Towhee	PICH1	12	202	0.0594	12	100.00	1547	0.0078
1999	110	House Wren	TRAE1	8	411	0.0195	11	72.73	1547	0.0071
1999	120	House Wren	TRAE1	1	2	0.5000	11	9.09	1547	0.0071
1999	230	House Wren	TRAE1	2	202	0.0099	11	18.18	1547	0.0071
1999	323	Horned Lark	ERAL1	6	159	0.0377	6	100.00	1547	0.0039
1999	110	Eastern Kingbird	TYTY1	3	411	0.0073	5	60.00	1547	0.0032
1999	110	Virginia's Warbler	VEVI1	4	411	0.0097	5	80.00	1547	0.0032
1999	212	Eastern Kingbird	TYTY1	1	124	0.0081	5	20.00	1547	0.0032
1999	230	Virginia's Warbler	VEVI1	1	202	0.0050	5	20.00	1547	0.0032
1999	322	Eastern Kingbird	TYTY1	1	159	0.0063	5	20.00	1547	0.0032
1999	324	Common Grackle	QUQU1	5	23	0.2174	5	100.00	1547	0.0032
1999	20	Northern Flicker	COAU1	1	98	0.0102	4	25.00	1547	0.0026
1999	110	Northern Flicker	COAU1	2	411	0.0049	4	50.00	1547	0.0026
1999	212	Northern Flicker	COAU1	1	124	0.0081	4	25.00	1547	0.0026
1999	30	Broad-tailed Hummingbird	SEPL1	2	109	0.0183	3	66.67	1547	0.0019

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	110	Western Wood-Pewee	COSO1	1	411	0.0024	3	33.33	1547	0.0019
1999	110	Broad-tailed Hummingbird	SEPL1	1	411	0.0024	3	33.33	1547	0.0019
1999	230	Western Wood-Pewee	COSO1	2	202	0.0099	3	66.67	1547	0.0019
1999	230	Rock Wren	SAOB1	2	202	0.0099	3	66.67	1547	0.0019
1999	322	Rock Wren	SAOB1	1	159	0.0063	3	33.33	1547	0.0019
1999	20	Pine Siskin	CAPI1	2	98	0.0204	2	100.00	1547	0.0013
1999	110	Loggerhead Shrike	LALU1	1	411	0.0024	2	50.00	1547	0.0013
1999	110	American redstart	SERU2	2	411	0.0049	2	100.00	1547	0.0013
1999	230	Common Raven	COCO1	2	202	0.0099	2	100.00	1547	0.0013
1999	322	Loggerhead Shrike	LALU1	1	159	0.0063	2	50.00	1547	0.0013
1999	54	Belted Kingfisher	CEAL1	1	104	0.0096	1	100.00	1547	0.0006
1999	120	Red-breasted Nuthatch	SICA2	1	2	0.5000	1	100.00	1547	0.0006
1999	230	Black-headed Grosbeak	PHME1	1	202	0.0050	1	100.00	1547	0.0006
1999	324	Common Nighthawk	CHMI1	1	23	0.0435	1	100.00	1547	0.0006
1998	10	European Starling	STVU1	1	49	0.0204	500	0.20	1339	0.3734
1998	30	European Starling	STVU1	37	111	0.3333	500	7.40	1339	0.3734
1998	110	European Starling	STVU1	239	352	0.6790	500	47.80	1339	0.3734
1998	211	European Starling	STVU1	2	50	0.0400	500	0.40	1339	0.3734
1998	212	European Starling	STVU1	204	79	2.5823	500	40.80	1339	0.3734
1998	322	European Starling	STVU1	13	67	0.1940	500	2.60	1339	0.3734
1998	324	European Starling	STVU1	4	28	0.1429	500	0.80	1339	0.3734
1998	10	Red-winged Blackbird	AGPH1	16	49	0.3265	425	3.76	1339	0.3174
1998	20	Red-winged Blackbird	AGPH1	48	74	0.6486	425	11.29	1339	0.3174
1998	30	Red-winged Blackbird	AGPH1	213	111	1.9189	425	50.12	1339	0.3174
1998	54	Red-winged Blackbird	AGPH1	4	131	0.0305	425	0.94	1339	0.3174
1998	93	Red-winged Blackbird	AGPH1	14	28	0.5000	425	3.29	1339	0.3174
1998	110	Red-winged Blackbird	AGPH1	51	352	0.1449	425	12.00	1339	0.3174
1998	211	Red-winged Blackbird	AGPH1	20	50	0.4000	425	4.71	1339	0.3174
1998	212	Red-winged Blackbird	AGPH1	37	79	0.4684	425	8.71	1339	0.3174
1998	230	Red-winged Blackbird	AGPH1	17	192	0.0885	425	4.00	1339	0.3174
1998	322	Red-winged Blackbird	AGPH1	5	67	0.0746	425	1.18	1339	0.3174
1998	10	House Finch	CAME2	5	49	0.1020	375	1.33	1339	0.2801
1998	20	House Finch	CAME2	2	74	0.0270	375	0.53	1339	0.2801
1998	30	House Finch	CAME2	11	111	0.0991	375	2.93	1339	0.2801
1998	93	House Finch	CAME2	1	28	0.0357	375	0.27	1339	0.2801
1998	110	House Finch	CAME2	209	352	0.5938	375	55.73	1339	0.2801

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	211	House Finch	CAME2	2	50	0.0400	375	0.53	1339	0.2801
1998	212	House Finch	CAME2	25	79	0.3165	375	6.67	1339	0.2801
1998	230	House Finch	CAME2	62	192	0.3229	375	16.53	1339	0.2801
1998	322	House Finch	CAME2	23	67	0.3433	375	6.13	1339	0.2801
1998	323	House Finch	CAME2	2	170	0.0118	375	0.53	1339	0.2801
1998	324	House Finch	CAME2	28	28	1.0000	375	7.47	1339	0.2801
1998	510	House Finch	CAME2	5	1	5.0000	375	1.33	1339	0.2801
1998	10	Vesper Sparrow	POGR1	7	49	0.1429	209	3.35	1339	0.1561
1998	20	Vesper Sparrow	POGR1	6	74	0.0811	209	2.87	1339	0.1561
1998	30	Vesper Sparrow	POGR1	15	111	0.1351	209	7.18	1339	0.1561
1998	110	Vesper Sparrow	POGR1	24	352	0.0682	209	11.48	1339	0.1561
1998	211	Vesper Sparrow	POGR1	8	50	0.1600	209	3.83	1339	0.1561
1998	212	Vesper Sparrow	POGR1	13	79	0.1646	209	6.22	1339	0.1561
1998	230	Vesper Sparrow	POGR1	20	192	0.1042	209	9.57	1339	0.1561
1998	322	Vesper Sparrow	POGR1	20	67	0.2985	209	9.57	1339	0.1561
1998	323	Vesper Sparrow	POGR1	83	170	0.4882	209	39.71	1339	0.1561
1998	324	Vesper Sparrow	POGR1	3	28	0.1071	209	1.44	1339	0.1561
1998	420	Vesper Sparrow	POGR1	5	6	0.8333	209	2.39	1339	0.1561
1998	530	Vesper Sparrow	POGR1	5	1	5.0000	209	2.39	1339	0.1561
1998	10	Western Meadowlark	STNE1	12	49	0.2449	152	7.89	1339	0.1135
1998	20	Western Meadowlark	STNE1	4	74	0.0541	152	2.63	1339	0.1135
1998	30	Western Meadowlark	STNE1	14	111	0.1261	152	9.21	1339	0.1135
1998	54	Western Meadowlark	STNE1	1	131	0.0076	152	0.66	1339	0.1135
1998	93	Western Meadowlark	STNE1	2	28	0.0714	152	1.32	1339	0.1135
1998	110	Western Meadowlark	STNE1	38	352	0.1080	152	25.00	1339	0.1135
1998	211	Western Meadowlark	STNE1	6	50	0.1200	152	3.95	1339	0.1135
1998	212	Western Meadowlark	STNE1	17	79	0.2152	152	11.18	1339	0.1135
1998	230	Western Meadowlark	STNE1	12	192	0.0625	152	7.89	1339	0.1135
1998	322	Western Meadowlark	STNE1	13	67	0.1940	152	8.55	1339	0.1135
1998	323	Western Meadowlark	STNE1	28	170	0.1647	152	18.42	1339	0.1135
1998	324	Western Meadowlark	STNE1	4	28	0.1429	152	2.63	1339	0.1135
1998	510	Western Meadowlark	STNE1	1	1	1.0000	152	0.66	1339	0.1135
1998	10	Barn Swallow	HIRU1	3	49	0.0612	149	2.01	1339	0.1113
1998	20	Barn Swallow	HIRU1	11	74	0.1486	149	7.38	1339	0.1113
1998	30	Barn Swallow	HIRU1	11	111	0.0991	149	7.38	1339	0.1113
1998	54	Barn Swallow	HIRU1	17	131	0.1298	149	11.41	1339	0.1113
1998	110	Barn Swallow	HIRU1	48	352	0.1364	149	32.21	1339	0.1113

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	211	Barn Swallow	HIRU1	6	50	0.1200	149	4.03	1339	0.1113
1998	212	Barn Swallow	HIRU1	18	79	0.2278	149	12.08	1339	0.1113
1998	230	Barn Swallow	HIRU1	7	192	0.0365	149	4.70	1339	0.1113
1998	322	Barn Swallow	HIRU1	7	67	0.1045	149	4.70	1339	0.1113
1998	323	Barn Swallow	HIRU1	5	170	0.0294	149	3.36	1339	0.1113
1998	324	Barn Swallow	HIRU1	9	28	0.3214	149	6.04	1339	0.1113
1998	510	Barn Swallow	HIRU1	7	1	7.0000	149	4.70	1339	0.1113
1998	10	American Goldfinch	CATR1	2	49	0.0408	110	1.82	1339	0.0822
1998	20	American Goldfinch	CATR1	1	74	0.0135	110	0.91	1339	0.0822
1998	110	American Goldfinch	CATR1	56	352	0.1591	110	50.91	1339	0.0822
1998	211	American Goldfinch	CATR1	5	50	0.1000	110	4.55	1339	0.0822
1998	212	American Goldfinch	CATR1	7	79	0.0886	110	6.36	1339	0.0822
1998	230	American Goldfinch	CATR1	39	192	0.2031	110	35.45	1339	0.0822
1998	10	Song Sparrow	MEME2	1	49	0.0204	104	0.96	1339	0.0777
1998	20	Song Sparrow	MEME2	6	74	0.0811	104	5.77	1339	0.0777
1998	30	Song Sparrow	MEME2	20	111	0.1802	104	19.23	1339	0.0777
1998	110	Song Sparrow	MEME2	32	352	0.0909	104	30.77	1339	0.0777
1998	211	Song Sparrow	MEME2	1	50	0.0200	104	0.96	1339	0.0777
1998	212	Song Sparrow	MEME2	9	79	0.1139	104	8.65	1339	0.0777
1998	230	Song Sparrow	MEME2	35	192	0.1823	104	33.65	1339	0.0777
1998	10	Grasshopper Sparrow	AMSA1	7	49	0.1429	96	7.29	1339	0.0717
1998	20	Grasshopper Sparrow	AMSA1	10	74	0.1351	96	10.42	1339	0.0717
1998	30	Grasshopper Sparrow	AMSA1	13	111	0.1171	96	13.54	1339	0.0717
1998	110	Grasshopper Sparrow	AMSA1	8	352	0.0227	96	8.33	1339	0.0717
1998	211	Grasshopper Sparrow	AMSA1	2	50	0.0400	96	2.08	1339	0.0717
1998	212	Grasshopper Sparrow	AMSA1	4	79	0.0506	96	4.17	1339	0.0717
1998	230	Grasshopper Sparrow	AMSA1	8	192	0.0417	96	8.33	1339	0.0717
1998	322	Grasshopper Sparrow	AMSA1	16	67	0.2388	96	16.67	1339	0.0717
1998	323	Grasshopper Sparrow	AMSA1	28	170	0.1647	96	29.17	1339	0.0717
1998	20	Mourning Dove	ZEMA1	2	74	0.0270	69	2.90	1339	0.0515
1998	30	Mourning Dove	ZEMA1	6	111	0.0541	69	8.70	1339	0.0515
1998	110	Mourning Dove	ZEMA1	50	352	0.1420	69	72.46	1339	0.0515
1998	212	Mourning Dove	ZEMA1	1	79	0.0127	69	1.45	1339	0.0515
1998	230	Mourning Dove	ZEMA1	4	192	0.0208	69	5.80	1339	0.0515
1998	322	Mourning Dove	ZEMA1	2	67	0.0299	69	2.90	1339	0.0515
1998	323	Mourning Dove	ZEMA1	3	170	0.0176	69	4.35	1339	0.0515
1998	324	Mourning Dove	ZEMA1	1	28	0.0357	69	1.45	1339	0.0515

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	30	Yellow-headed Blackbird	XAXA1	64	111	0.5766	64	100.00	1339	0.0478
1998	110	Rufous-sided Towhee	PIER1	1	352	0.0028	62	1.61	1339	0.0463
1998	230	Rufous-sided Towhee	PIER1	61	192	0.3177	62	98.39	1339	0.0463
1998	30	Cliff Swallow	HIPY1	7	111	0.0631	50	14.00	1339	0.0373
1998	54	Cliff Swallow	HIPY1	9	131	0.0687	50	18.00	1339	0.0373
1998	93	Cliff Swallow	HIPY1	2	28	0.0714	50	4.00	1339	0.0373
1998	110	Cliff Swallow	HIPY1	1	352	0.0028	50	2.00	1339	0.0373
1998	212	Cliff Swallow	HIPY1	24	79	0.3038	50	48.00	1339	0.0373
1998	323	Cliff Swallow	HIPY1	5	170	0.0294	50	10.00	1339	0.0373
1998	324	Cliff Swallow	HIPY1	2	28	0.0714	50	4.00	1339	0.0373
1998	10	Northern Oriole	ICGA1	1	49	0.0204	48	2.08	1339	0.0358
1998	110	Northern Oriole	ICGA1	36	352	0.1023	48	75.00	1339	0.0358
1998	211	Northern Oriole	ICGA1	3	50	0.0600	48	6.25	1339	0.0358
1998	212	Northern Oriole	ICGA1	2	79	0.0253	48	4.17	1339	0.0358
1998	230	Northern Oriole	ICGA1	6	192	0.0313	48	12.50	1339	0.0358
1998	10	Common Yellowthroat	GETR1	3	49	0.0612	47	6.38	1339	0.0351
1998	20	Common Yellowthroat	GETR1	7	74	0.0946	47	14.89	1339	0.0351
1998	30	Common Yellowthroat	GETR1	17	111	0.1532	47	36.17	1339	0.0351
1998	110	Common Yellowthroat	GETR1	11	352	0.0313	47	23.40	1339	0.0351
1998	211	Common Yellowthroat	GETR1	2	50	0.0400	47	4.26	1339	0.0351
1998	212	Common Yellowthroat	GETR1	3	79	0.0380	47	6.38	1339	0.0351
1998	230	Common Yellowthroat	GETR1	4	192	0.0208	47	8.51	1339	0.0351
1998	10	Pine Siskin	CAPI1	5	49	0.1020	43	11.63	1339	0.0321
1998	20	Pine Siskin	CAPI1	5	74	0.0676	43	11.63	1339	0.0321
1998	110	Pine Siskin	CAPI1	9	352	0.0256	43	20.93	1339	0.0321
1998	230	Pine Siskin	CAPI1	24	192	0.1250	43	55.81	1339	0.0321
1998	10	American Robin	TUMI1	1	49	0.0204	37	2.70	1339	0.0276
1998	20	American Robin	TUMI1	4	74	0.0541	37	10.81	1339	0.0276
1998	30	American Robin	TUMI1	1	111	0.0090	37	2.70	1339	0.0276
1998	110	American Robin	TUMI1	17	352	0.0483	37	45.95	1339	0.0276
1998	212	American Robin	TUMI1	1	79	0.0127	37	2.70	1339	0.0276
1998	230	American Robin	TUMI1	8	192	0.0417	37	21.62	1339	0.0276
1998	322	American Robin	TUMI1	4	67	0.0597	37	10.81	1339	0.0276
1998	324	American Robin	TUMI1	1	28	0.0357	37	2.70	1339	0.0276
1998	10	Blue Grosbeak	GUCA1	1	49	0.0204	36	2.78	1339	0.0269
1998	20	Blue Grosbeak	GUCA1	2	74	0.0270	36	5.56	1339	0.0269
1998	110	Yellow Warbler	DEPE1	33	352	0.0938	36	91.67	1339	0.0269

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	110	Blue Grosbeak	GUCA1	24	352	0.0682	36	66.67	1339	0.0269
1998	211	Blue Grosbeak	GUCA1	3	50	0.0600	36	8.33	1339	0.0269
1998	212	Blue Grosbeak	GUCA1	1	79	0.0127	36	2.78	1339	0.0269
1998	230	Yellow Warbler	DEPE1	2	192	0.0104	36	5.56	1339	0.0269
1998	230	Blue Grosbeak	GUCA1	3	192	0.0156	36	8.33	1339	0.0269
1998	322	Yellow Warbler	DEPE1	1	67	0.0149	36	2.78	1339	0.0269
1998	322	Blue Grosbeak	GUCA1	2	67	0.0299	36	5.56	1339	0.0269
1998	93	Western Kingbird	TYVE1	1	28	0.0357	33	3.03	1339	0.0246
1998	110	Western Kingbird	TYVE1	24	352	0.0682	33	72.73	1339	0.0246
1998	212	Western Kingbird	TYVE1	4	79	0.0506	33	12.12	1339	0.0246
1998	322	Western Kingbird	TYVE1	2	67	0.0299	33	6.06	1339	0.0246
1998	323	Western Kingbird	TYVE1	1	170	0.0059	33	3.03	1339	0.0246
1998	324	Western Kingbird	TYVE1	1	28	0.0357	33	3.03	1339	0.0246
1998	10	Black-billed Magpie	PIPI1	5	49	0.1020	32	15.63	1339	0.0239
1998	20	Black-billed Magpie	PIPI1	2	74	0.0270	32	6.25	1339	0.0239
1998	93	Brewer's Blackbird	EUCY1	15	28	0.5357	32	46.88	1339	0.0239
1998	110	Brewer's Blackbird	EUCY1	15	352	0.0426	32	46.88	1339	0.0239
1998	110	Black-billed Magpie	PIPI1	15	352	0.0426	32	46.88	1339	0.0239
1998	230	Black-billed Magpie	PIPI1	9	192	0.0469	32	28.13	1339	0.0239
1998	322	Brewer's Blackbird	EUCY1	1	67	0.0149	32	3.13	1339	0.0239
1998	323	Brewer's Blackbird	EUCY1	1	170	0.0059	32	3.13	1339	0.0239
1998	323	Black-billed Magpie	PIPI1	1	170	0.0059	32	3.13	1339	0.0239
1998	212	Lark Sparrow	CHGR1	1	79	0.0127	25	4.00	1339	0.0187
1998	230	Lark Sparrow	CHGR1	4	192	0.0208	25	16.00	1339	0.0187
1998	323	Lark Sparrow	CHGR1	18	170	0.1059	25	72.00	1339	0.0187
1998	324	Lark Sparrow	CHGR1	2	28	0.0714	25	8.00	1339	0.0187
1998	110	Chipping Sparrow	SPPA1	9	352	0.0256	20	45.00	1339	0.0149
1998	212	Chipping Sparrow	SPPA1	1	79	0.0127	20	5.00	1339	0.0149
1998	230	Chipping Sparrow	SPPA1	10	192	0.0521	20	50.00	1339	0.0149
1998	30	Say's Phoebe	SASA1	2	111	0.0180	19	10.53	1339	0.0142
1998	93	Say's Phoebe	SASA1	1	28	0.0357	19	5.26	1339	0.0142
1998	110	Say's Phoebe	SASA1	4	352	0.0114	19	21.05	1339	0.0142
1998	211	Say's Phoebe	SASA1	1	50	0.0200	19	5.26	1339	0.0142
1998	212	Say's Phoebe	SASA1	3	79	0.0380	19	15.79	1339	0.0142
1998	230	Say's Phoebe	SASA1	2	192	0.0104	19	10.53	1339	0.0142
1998	322	Say's Phoebe	SASA1	2	67	0.0299	19	10.53	1339	0.0142

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	323	Say's Phoebe	SASA1	2	170	0.0118	19	10.53	1339	0.0142
1998	324	Say's Phoebe	SASA1	2	28	0.0714	19	10.53	1339	0.0142
1998	110	Black-capped Chickadee	PAAT1	5	352	0.0142	17	29.41	1339	0.0127
1998	212	Black-capped Chickadee	PAAT1	2	79	0.0253	17	11.76	1339	0.0127
1998	230	Black-capped Chickadee	PAAT1	10	192	0.0521	17	58.82	1339	0.0127
1998	110	Brown-headed Cowbird	MOAT1	6	352	0.0170	16	37.50	1339	0.0119
1998	110	House Wren	TRAE1	11	352	0.0313	16	68.75	1339	0.0119
1998	230	Brown-headed Cowbird	MOAT1	10	192	0.0521	16	62.50	1339	0.0119
1998	230	House Wren	TRAE1	5	192	0.0260	16	31.25	1339	0.0119
1998	20	Lesser Goldfinch	CAPS1	1	74	0.0135	15	6.67	1339	0.0112
1998	110	Lesser Goldfinch	CAPS1	10	352	0.0284	15	66.67	1339	0.0112
1998	230	Lesser Goldfinch	CAPS1	4	192	0.0208	15	26.67	1339	0.0112
1998	110	Eastern Phoebe	SAPH1	7	352	0.0199	10	70.00	1339	0.0075
1998	230	Eastern Phoebe	SAPH1	3	192	0.0156	10	30.00	1339	0.0075
1998	230	Sage Thrasher	ORMO1	4	192	0.0208	7	57.14	1339	0.0052
1998	420	Sage Thrasher	ORMO1	3	6	0.5000	7	42.86	1339	0.0052
1998	230	Yellow-breasted Chat	ICVI1	6	192	0.0313	6	100.00	1339	0.0045
1998	110	Northern Flicker	COAU1	4	352	0.0114	5	80.00	1339	0.0037
1998	110	Green-tailed Towhee	PICH1	1	352	0.0028	5	20.00	1339	0.0037
1998	230	Northern Flicker	COAU1	1	192	0.0052	5	20.00	1339	0.0037
1998	230	Green-tailed Towhee	PICH1	4	192	0.0208	5	80.00	1339	0.0037
1998	20	Broad-tailed Hummingbird	SEPL1	1	74	0.0135	4	25.00	1339	0.0030
1998	110	Broad-tailed Hummingbird	SEPL1	1	352	0.0028	4	25.00	1339	0.0030
1998	230	Broad-tailed Hummingbird	SEPL1	1	192	0.0052	4	25.00	1339	0.0030
1998	322	Broad-tailed Hummingbird	SEPL1	1	67	0.0149	4	25.00	1339	0.0030
1998	110	Common Nighthawk	CHMI1	1	352	0.0028	3	33.33	1339	0.0022
1998	110	Western Wood-Pewee	COSO1	2	352	0.0057	3	66.67	1339	0.0022
1998	230	Western Wood-Pewee	COSO1	1	192	0.0052	3	33.33	1339	0.0022
1998	323	Common Nighthawk	CHMI1	2	170	0.0118	3	66.67	1339	0.0022
1998	110	Dark-eyed Junco	JUHY1	2	352	0.0057	2	100.00	1339	0.0015
1998	110	Eastern Kingbird	TYTY1	2	352	0.0057	2	100.00	1339	0.0015
1998	323	Horned Lark	ERAL1	2	170	0.0118	2	100.00	1339	0.0015
1998	93	Common Grackle	QUQU1	1	28	0.0357	1	100.00	1339	0.0007
1998	110	Black-headed Grosbeak	PHME1	1	352	0.0028	1	100.00	1339	0.0007
1998	110	Downy Woodpecker	PIPU1	1	352	0.0028	1	100.00	1339	0.0007
1998	230	Chestnut-sided warbler	DEPE2	1	192	0.0052	1	100.00	1339	0.0007

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs.Min Season
1997	10	House Finch	CAME2	18	75	0.2400	802	2.24	1361	0.5893
1997	20	House Finch	CAME2	10	80	0.1250	802	1.25	1361	0.5893
1997	30	House Finch	CAME2	15	129	0.1163	802	1.87	1361	0.5893
1997	54	House Finch	CAME2	3	102	0.0294	802	0.37	1361	0.5893
1997	110	House Finch	CAME2	519	327	1.5872	802	64.71	1361	0.5893
1997	211	House Finch	CAME2	28	62	0.4516	802	3.49	1361	0.5893
1997	212	House Finch	CAME2	58	92	0.6304	802	7.23	1361	0.5893
1997	230	House Finch	CAME2	64	212	0.3019	802	7.98	1361	0.5893
1997	322	House Finch	CAME2	28	77	0.3636	802	3.49	1361	0.5893
1997	323	House Finch	CAME2	10	126	0.0794	802	1.25	1361	0.5893
1997	324	House Finch	CAME2	16	34	0.4706	802	2.00	1361	0.5893
1997	540	House Finch	CAME2	33	8	4.1250	802	4.11	1361	0.5893
1997	10	Red-winged Blackbird	AGPH1	22	75	0.2933	580	3.79	1361	0.4262
1997	20	Red-winged Blackbird	AGPH1	41	80	0.5125	580	7.07	1361	0.4262
1997	30	Red-winged Blackbird	AGPH1	250	129	1.9380	580	43.10	1361	0.4262
1997	54	Red-winged Blackbird	AGPH1	5	102	0.0490	580	0.86	1361	0.4262
1997	93	Red-winged Blackbird	AGPH1	169	31	5.4516	580	29.14	1361	0.4262
1997	110	Red-winged Blackbird	AGPH1	36	327	0.1101	580	6.21	1361	0.4262
1997	212	Red-winged Blackbird	AGPH1	25	92	0.2717	580	4.31	1361	0.4262
1997	230	Red-winged Blackbird	AGPH1	22	212	0.1038	580	3.79	1361	0.4262
1997	323	Red-winged Blackbird	AGPH1	8	126	0.0635	580	1.38	1361	0.4262
1997	324	Red-winged Blackbird	AGPH1	2	34	0.0588	580	0.34	1361	0.4262
1997	10	Vesper Sparrow	POGR1	15	75	0.2000	320	4.69	1361	0.2351
1997	20	Vesper Sparrow	POGR1	11	80	0.1375	320	3.44	1361	0.2351
1997	30	Vesper Sparrow	POGR1	10	129	0.0775	320	3.13	1361	0.2351
1997	110	Vesper Sparrow	POGR1	52	327	0.1590	320	16.25	1361	0.2351
1997	211	Vesper Sparrow	POGR1	20	62	0.3226	320	6.25	1361	0.2351
1997	212	Vesper Sparrow	POGR1	15	92	0.1630	320	4.69	1361	0.2351
1997	230	Vesper Sparrow	POGR1	46	212	0.2170	320	14.38	1361	0.2351
1997	322	Vesper Sparrow	POGR1	17	77	0.2208	320	5.31	1361	0.2351
1997	323	Vesper Sparrow	POGR1	127	126	1.0079	320	39.69	1361	0.2351
1997	324	Vesper Sparrow	POGR1	6	34	0.1765	320	1.88	1361	0.2351
1997	540	Vesper Sparrow	POGR1	1	8	0.1250	320	0.31	1361	0.2351
1997	10	Western Meadowlark	STNE1	10	75	0.1333	280	3.57	1361	0.2057
1997	20	Western Meadowlark	STNE1	17	80	0.2125	280	6.07	1361	0.2057
1997	30	Western Meadowlark	STNE1	4	129	0.0310	280	1.43	1361	0.2057
1997	54	Western Meadowlark	STNE1	1	102	0.0098	280	0.36	1361	0.2057

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	93	Western Meadowlark	STNE1	6	31	0.1935	280	2.14	1361	0.2057
1997	110	Western Meadowlark	STNE1	104	327	0.3180	280	37.14	1361	0.2057
1997	211	Western Meadowlark	STNE1	10	62	0.1613	280	3.57	1361	0.2057
1997	212	Western Meadowlark	STNE1	17	92	0.1848	280	6.07	1361	0.2057
1997	230	Western Meadowlark	STNE1	34	212	0.1604	280	12.14	1361	0.2057
1997	322	Western Meadowlark	STNE1	25	77	0.3247	280	8.93	1361	0.2057
1997	323	Western Meadowlark	STNE1	43	126	0.3413	280	15.36	1361	0.2057
1997	324	Western Meadowlark	STNE1	9	34	0.2647	280	3.21	1361	0.2057
1997	10	European Starling	STVU1	2	75	0.0267	222	0.90	1361	0.1631
1997	20	European Starling	STVU1	7	80	0.0875	222	3.15	1361	0.1631
1997	30	European Starling	STVU1	10	129	0.0775	222	4.50	1361	0.1631
1997	110	European Starling	STVU1	181	327	0.5535	222	81.53	1361	0.1631
1997	211	European Starling	STVU1	1	62	0.0161	222	0.45	1361	0.1631
1997	212	European Starling	STVU1	1	92	0.0109	222	0.45	1361	0.1631
1997	322	European Starling	STVU1	19	77	0.2468	222	8.56	1361	0.1631
1997	324	European Starling	STVU1	1	34	0.0294	222	0.45	1361	0.1631
1997	10	American Goldfinch	CATR1	2	75	0.0267	171	1.17	1361	0.1256
1997	20	American Goldfinch	CATR1	2	80	0.0250	171	1.17	1361	0.1256
1997	30	American Goldfinch	CATR1	3	129	0.0233	171	1.75	1361	0.1256
1997	54	American Goldfinch	CATR1	1	102	0.0098	171	0.58	1361	0.1256
1997	110	American Goldfinch	CATR1	92	327	0.2813	171	53.80	1361	0.1256
1997	211	American Goldfinch	CATR1	6	62	0.0968	171	3.51	1361	0.1256
1997	212	American Goldfinch	CATR1	7	92	0.0761	171	4.09	1361	0.1256
1997	230	American Goldfinch	CATR1	58	212	0.2736	171	33.92	1361	0.1256
1997	10	Cliff Swallow	HIPY1	1	75	0.0133	167	0.60	1361	0.1227
1997	20	Cliff Swallow	HIPY1	2	80	0.0250	167	1.20	1361	0.1227
1997	30	Cliff Swallow	HIPY1	3	129	0.0233	167	1.80	1361	0.1227
1997	54	Cliff Swallow	HIPY1	16	102	0.1569	167	9.58	1361	0.1227
1997	110	Cliff Swallow	HIPY1	102	327	0.3119	167	61.08	1361	0.1227
1997	211	Cliff Swallow	HIPY1	2	62	0.0323	167	1.20	1361	0.1227
1997	212	Cliff Swallow	HIPY1	20	92	0.2174	167	11.98	1361	0.1227
1997	230	Cliff Swallow	HIPY1	11	212	0.0519	167	6.59	1361	0.1227
1997	322	Cliff Swallow	HIPY1	1	77	0.0130	167	0.60	1361	0.1227
1997	323	Cliff Swallow	HIPY1	9	126	0.0714	167	5.39	1361	0.1227
1997	10	Barn Swallow	HIRU1	1	75	0.0133	144	0.69	1361	0.1058
1997	20	Barn Swallow	HIRU1	7	80	0.0875	144	4.86	1361	0.1058
1997	30	Barn Swallow	HIRU1	49	129	0.3798	144	34.03	1361	0.1058

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	54	Barn Swallow	HIRU1	10	102	0.0980	144	6.94	1361	0.1058
1997	93	Barn Swallow	HIRU1	4	31	0.1290	144	2.78	1361	0.1058
1997	110	Barn Swallow	HIRU1	36	327	0.1101	144	25.00	1361	0.1058
1997	211	Barn Swallow	HIRU1	8	62	0.1290	144	5.56	1361	0.1058
1997	212	Barn Swallow	HIRU1	16	92	0.1739	144	11.11	1361	0.1058
1997	322	Barn Swallow	HIRU1	7	77	0.0909	144	4.86	1361	0.1058
1997	324	Barn Swallow	HIRU1	6	34	0.1765	144	4.17	1361	0.1058
1997	110	Rufous-sided Towhee	PIER1	1	327	0.0031	98	1.02	1361	0.0720
1997	230	Rufous-sided Towhee	PIER1	97	212	0.4575	98	98.98	1361	0.0720
1997	10	Mourning Dove	ZEMA1	1	75	0.0133	97	1.03	1361	0.0713
1997	20	Mourning Dove	ZEMA1	3	80	0.0375	97	3.09	1361	0.0713
1997	30	Mourning Dove	ZEMA1	4	129	0.0310	97	4.12	1361	0.0713
1997	54	Mourning Dove	ZEMA1	1	102	0.0098	97	1.03	1361	0.0713
1997	110	Mourning Dove	ZEMA1	68	327	0.2080	97	70.10	1361	0.0713
1997	212	Mourning Dove	ZEMA1	12	92	0.1304	97	12.37	1361	0.0713
1997	230	Mourning Dove	ZEMA1	2	212	0.0094	97	2.06	1361	0.0713
1997	322	Mourning Dove	ZEMA1	1	77	0.0130	97	1.03	1361	0.0713
1997	324	Mourning Dove	ZEMA1	5	34	0.1471	97	5.15	1361	0.0713
1997	10	Song Sparrow	MEME2	1	75	0.0133	94	1.06	1361	0.0691
1997	20	Song Sparrow	MEME2	5	80	0.0625	94	5.32	1361	0.0691
1997	30	Song Sparrow	MEME2	19	129	0.1473	94	20.21	1361	0.0691
1997	110	Song Sparrow	MEME2	30	327	0.0917	94	31.91	1361	0.0691
1997	212	Song Sparrow	MEME2	10	92	0.1087	94	10.64	1361	0.0691
1997	230	Song Sparrow	MEME2	29	212	0.1368	94	30.85	1361	0.0691
1997	20	Brewer's Blackbird	EUCY1	21	80	0.2625	89	23.60	1361	0.0654
1997	30	Brewer's Blackbird	EUCY1	35	129	0.2713	89	39.33	1361	0.0654
1997	54	Brewer's Blackbird	EUCY1	1	102	0.0098	89	1.12	1361	0.0654
1997	110	Brewer's Blackbird	EUCY1	27	327	0.0826	89	30.34	1361	0.0654
1997	212	Brewer's Blackbird	EUCY1	1	92	0.0109	89	1.12	1361	0.0654
1997	323	Brewer's Blackbird	EUCY1	4	126	0.0317	89	4.49	1361	0.0654
1997	230	Lark Bunting	CAME3	55	212	0.2594	82	67.07	1361	0.0602
1997	323	Lark Bunting	CAME3	27	126	0.2143	82	32.93	1361	0.0602
1997	30	Yellow-headed Blackbird	XAXA1	59	129	0.4574	63	93.65	1361	0.0463
1997	54	Yellow-headed Blackbird	XAXA1	1	102	0.0098	63	1.59	1361	0.0463
1997	93	Yellow-headed Blackbird	XAXA1	3	31	0.0968	63	4.76	1361	0.0463
1997	30	Northern Oriole	ICGA1	1	129	0.0078	62	1.61	1361	0.0456
1997	110	Northern Oriole	ICGA1	52	327	0.1590	62	83.87	1361	0.0456

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	211	Northern Oriole	ICGA1	1	62	0.0161	62	1.61	1361	0.0456
1997	212	Northern Oriole	ICGA1	3	92	0.0326	62	4.84	1361	0.0456
1997	230	Northern Oriole	ICGA1	3	212	0.0142	62	4.84	1361	0.0456
1997	322	Northern Oriole	ICGA1	2	77	0.0260	62	3.23	1361	0.0456
1997	20	American Robin	TUMI1	4	80	0.0500	61	6.56	1361	0.0448
1997	110	American Robin	TUMI1	16	327	0.0489	61	26.23	1361	0.0448
1997	212	American Robin	TUMI1	2	92	0.0217	61	3.28	1361	0.0448
1997	230	American Robin	TUMI1	38	212	0.1792	61	62.30	1361	0.0448
1997	324	American Robin	TUMI1	1	34	0.0294	61	1.64	1361	0.0448
1997	10	Grasshopper Sparrow	AMSA1	6	75	0.0800	55	10.91	1361	0.0404
1997	20	Grasshopper Sparrow	AMSA1	2	80	0.0250	55	3.64	1361	0.0404
1997	30	Grasshopper Sparrow	AMSA1	9	129	0.0698	55	16.36	1361	0.0404
1997	110	Grasshopper Sparrow	AMSA1	3	327	0.0092	55	5.45	1361	0.0404
1997	211	Grasshopper Sparrow	AMSA1	4	62	0.0645	55	7.27	1361	0.0404
1997	230	Grasshopper Sparrow	AMSA1	3	212	0.0142	55	5.45	1361	0.0404
1997	323	Grasshopper Sparrow	AMSA1	28	126	0.2222	55	50.91	1361	0.0404
1997	20	Western Kingbird	TYVE1	1	80	0.0125	46	2.17	1361	0.0338
1997	110	Western Kingbird	TYVE1	40	327	0.1223	46	86.96	1361	0.0338
1997	322	Western Kingbird	TYVE1	3	77	0.0390	46	6.52	1361	0.0338
1997	323	Western Kingbird	TYVE1	2	126	0.0159	46	4.35	1361	0.0338
1997	20	Blue Grosbeak	GUCA1	4	80	0.0500	39	10.26	1361	0.0287
1997	110	Blue Grosbeak	GUCA1	20	327	0.0612	39	51.28	1361	0.0287
1997	211	Blue Grosbeak	GUCA1	4	62	0.0645	39	10.26	1361	0.0287
1997	212	Blue Grosbeak	GUCA1	5	92	0.0543	39	12.82	1361	0.0287
1997	322	Blue Grosbeak	GUCA1	3	77	0.0390	39	7.69	1361	0.0287
1997	323	Blue Grosbeak	GUCA1	3	126	0.0238	39	7.69	1361	0.0287
1997	20	Common Yellowthroat	GETR1	1	80	0.0125	37	2.70	1361	0.0272
1997	30	Common Yellowthroat	GETR1	15	129	0.1163	37	40.54	1361	0.0272
1997	110	Common Yellowthroat	GETR1	6	327	0.0183	37	16.22	1361	0.0272
1997	211	Common Yellowthroat	GETR1	2	62	0.0323	37	5.41	1361	0.0272
1997	212	Common Yellowthroat	GETR1	10	92	0.1087	37	27.03	1361	0.0272
1997	230	Common Yellowthroat	GETR1	3	212	0.0142	37	8.11	1361	0.0272
1997	10	Lesser Goldfinch	CAPS1	2	75	0.0267	36	5.56	1361	0.0265
1997	30	Lesser Goldfinch	CAPS1	1	129	0.0078	36	2.78	1361	0.0265
1997	110	Lesser Goldfinch	CAPS1	17	327	0.0520	36	47.22	1361	0.0265
1997	230	Lesser Goldfinch	CAPS1	16	212	0.0755	36	44.44	1361	0.0265

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	110	Yellow Warbler	DEPE1	20	327	0.0612	27	74.07	1361	0.0198
1997	211	Yellow Warbler	DEPE1	1	62	0.0161	27	3.70	1361	0.0198
1997	212	Yellow Warbler	DEPE1	1	92	0.0109	27	3.70	1361	0.0198
1997	230	Yellow Warbler	DEPE1	5	212	0.0236	27	18.52	1361	0.0198
1997	110	Brown-headed Cowbird	MOAT1	10	327	0.0306	22	45.45	1361	0.0162
1997	211	Brown-headed Cowbird	MOAT1	4	62	0.0645	22	18.18	1361	0.0162
1997	212	Brown-headed Cowbird	MOAT1	1	92	0.0109	22	4.55	1361	0.0162
1997	230	Brown-headed Cowbird	MOAT1	7	212	0.0330	22	31.82	1361	0.0162
1997	10	Black-billed Magpie	PIPI1	1	75	0.0133	21	4.76	1361	0.0154
1997	110	Black-billed Magpie	PIPI1	7	327	0.0214	21	33.33	1361	0.0154
1997	212	Black-billed Magpie	PIPI1	2	92	0.0217	21	9.52	1361	0.0154
1997	230	Black-billed Magpie	PIPI1	11	212	0.0519	21	52.38	1361	0.0154
1997	110	Black-capped Chickadee	PAAT1	5	327	0.0153	16	31.25	1361	0.0118
1997	230	Black-capped Chickadee	PAAT1	11	212	0.0519	16	68.75	1361	0.0118
1997	20	Say's Phoebe	SASA1	1	80	0.0125	15	6.67	1361	0.0110
1997	30	Say's Phoebe	SASA1	1	129	0.0078	15	6.67	1361	0.0110
1997	110	Say's Phoebe	SASA1	6	327	0.0183	15	40.00	1361	0.0110
1997	212	Say's Phoebe	SASA1	1	92	0.0109	15	6.67	1361	0.0110
1997	230	Say's Phoebe	SASA1	2	212	0.0094	15	13.33	1361	0.0110
1997	322	Say's Phoebe	SASA1	3	77	0.0390	15	20.00	1361	0.0110
1997	323	Say's Phoebe	SASA1	1	126	0.0079	15	6.67	1361	0.0110
1997	230	Green-tailed Towhee	PICH1	12	212	0.0566	12	100.00	1361	0.0088
1997	30	House Wren	TRAE1	1	129	0.0078	10	10.00	1361	0.0073
1997	110	House Wren	TRAE1	3	327	0.0092	10	30.00	1361	0.0073
1997	212	House Wren	TRAE1	2	92	0.0217	10	20.00	1361	0.0073
1997	230	House Wren	TRAE1	4	212	0.0189	10	40.00	1361	0.0073
1997	110	Eastern Phoebe	SAPH1	4	327	0.0122	9	44.44	1361	0.0066
1997	211	Eastern Phoebe	SAPH1	1	62	0.0161	9	11.11	1361	0.0066
1997	212	Eastern Phoebe	SAPH1	2	92	0.0217	9	22.22	1361	0.0066
1997	230	Eastern Phoebe	SAPH1	1	212	0.0047	9	11.11	1361	0.0066
1997	322	Eastern Phoebe	SAPH1	1	77	0.0130	9	11.11	1361	0.0066
1997	110	Yellow-breasted Chat	ICVI1	1	327	0.0031	8	12.50	1361	0.0059
1997	230	Yellow-breasted Chat	ICVI1	7	212	0.0330	8	87.50	1361	0.0059
1997	110	Lark Sparrow	CHGR1	3	327	0.0092	7	42.86	1361	0.0051
1997	212	Lark Sparrow	CHGR1	3	92	0.0326	7	42.86	1361	0.0051
1997	230	Lark Sparrow	CHGR1	1	212	0.0047	7	14.29	1361	0.0051

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	230	Sage Thrasher	ORMO1	5	212	0.0236	7	71.43	1361	0.0051
1997	322	Sage Thrasher	ORMO1	2	77	0.0260	7	28.57	1361	0.0051
1997	323	Horned Lark	ERAL1	7	126	0.0556	7	100.00	1361	0.0051
1997	110	Eastern Kingbird	TYTY1	5	327	0.0153	5	100.00	1361	0.0037
1997	230	Broad-tailed Hummingbird	SEPL1	3	212	0.0142	4	75.00	1361	0.0029
1997	230	Chipping Sparrow	SPPA1	4	212	0.0189	4	100.00	1361	0.0029
1997	323	Broad-tailed Hummingbird	SEPL1	1	126	0.0079	4	25.00	1361	0.0029
1997	93	Wilson's Phalarope	PHTR1	3	31	0.0968	3	100.00	1361	0.0022
1997	110	Rock Dove	COLI1	2	327	0.0061	2	100.00	1361	0.0015
1997	230	Golden-crowned Kinglet	RESA1	2	212	0.0094	2	100.00	1361	0.0015
1997	323	Common Poorwill	PHNU1	2	126	0.0159	2	100.00	1361	0.0015
1997	30	Prairie rattlesnake	CRVI1	1	129	0.0078	1	100.00	1361	0.0007
1997	30	Wilson's Warbler	WIPU1	1	129	0.0078	1	100.00	1361	0.0007
1997	54	Tree Swallow	TABI1	1	102	0.0098	1	100.00	1361	0.0007
1997	110	Northern Flicker	COAU1	1	327	0.0031	1	100.00	1361	0.0007
1997	110	Common Raven	COCO1	1	327	0.0031	1	100.00	1361	0.0007
1997	110	Yellow-rumped Warbler	DECO1	1	327	0.0031	1	100.00	1361	0.0007
1997	212	Violet-green Swallow	TATH1	1	92	0.0109	1	100.00	1361	0.0007
1997	230	Western Wood-Pewee	COSO1	1	212	0.0047	1	100.00	1361	0.0007
1997	230	Loggerhead Shrike	LALU1	1	212	0.0047	1	100.00	1361	0.0007
1997	324	Common Nighthawk	CHMI1	1	34	0.0294	1	100.00	1361	0.0007
1996	10	Red-winged Blackbird	AGPH1	9	79	0.1139	508	1.77	1609	0.3157
1996	20	Red-winged Blackbird	AGPH1	54	60	0.9000	508	10.63	1609	0.3157
1996	30	Red-winged Blackbird	AGPH1	198	132	1.5000	508	38.98	1609	0.3157
1996	54	Red-winged Blackbird	AGPH1	4	85	0.0471	508	0.79	1609	0.3157
1996	93	Red-winged Blackbird	AGPH1	29	32	0.9063	508	5.71	1609	0.3157
1996	110	Red-winged Blackbird	AGPH1	24	451	0.0532	508	4.72	1609	0.3157
1996	211	Red-winged Blackbird	AGPH1	2	66	0.0303	508	0.39	1609	0.3157
1996	212	Red-winged Blackbird	AGPH1	36	118	0.3051	508	7.09	1609	0.3157
1996	230	Red-winged Blackbird	AGPH1	28	186	0.1505	508	5.51	1609	0.3157
1996	322	Red-winged Blackbird	AGPH1	40	119	0.3361	508	7.87	1609	0.3157
1996	324	Red-winged Blackbird	AGPH1	62	35	1.7714	508	12.20	1609	0.3157
1996	410	Red-winged Blackbird	AGPH1	5	5	1.0000	508	0.98	1609	0.3157
1996	420	Red-winged Blackbird	AGPH1	17	3	5.6667	508	3.35	1609	0.3157
1996	10	House Finch	CAME2	11	79	0.1392	437	2.52	1609	0.2716
1996	20	House Finch	CAME2	11	60	0.1833	437	2.52	1609	0.2716
1996	30	House Finch	CAME2	14	132	0.1061	437	3.20	1609	0.2716

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	54	House Finch	CAME2	4	85	0.0471	437	0.92	1609	0.2716
1996	93	House Finch	CAME2	8	32	0.2500	437	1.83	1609	0.2716
1996	110	House Finch	CAME2	214	451	0.4745	437	48.97	1609	0.2716
1996	211	House Finch	CAME2	15	66	0.2273	437	3.43	1609	0.2716
1996	212	House Finch	CAME2	46	118	0.3898	437	10.53	1609	0.2716
1996	230	House Finch	CAME2	13	186	0.0699	437	2.97	1609	0.2716
1996	322	House Finch	CAME2	36	119	0.3025	437	8.24	1609	0.2716
1996	323	House Finch	CAME2	9	210	0.0429	437	2.06	1609	0.2716
1996	324	House Finch	CAME2	20	35	0.5714	437	4.58	1609	0.2716
1996	410	House Finch	CAME2	15	5	3.0000	437	3.43	1609	0.2716
1996	420	House Finch	CAME2	4	3	1.3333	437	0.92	1609	0.2716
1996	510	House Finch	CAME2	1	1	1.0000	437	0.23	1609	0.2716
1996	530	House Finch	CAME2	1	3	0.3333	437	0.23	1609	0.2716
1996	540	House Finch	CAME2	15	11	1.3636	437	3.43	1609	0.2716
1996	20	European Starling	STVU1	9	60	0.1500	276	3.26	1609	0.1715
1996	54	European Starling	STVU1	1	85	0.0118	276	0.36	1609	0.1715
1996	110	European Starling	STVU1	80	451	0.1774	276	28.99	1609	0.1715
1996	212	European Starling	STVU1	3	118	0.0254	276	1.09	1609	0.1715
1996	230	European Starling	STVU1	176	186	0.9462	276	63.77	1609	0.1715
1996	323	European Starling	STVU1	5	210	0.0238	276	1.81	1609	0.1715
1996	324	European Starling	STVU1	2	35	0.0571	276	0.72	1609	0.1715
1996	10	Vesper Sparrow	POGR1	9	79	0.1139	265	3.40	1609	0.1647
1996	20	Vesper Sparrow	POGR1	13	60	0.2167	265	4.91	1609	0.1647
1996	30	Vesper Sparrow	POGR1	8	132	0.0606	265	3.02	1609	0.1647
1996	93	Vesper Sparrow	POGR1	1	32	0.0313	265	0.38	1609	0.1647
1996	110	Vesper Sparrow	POGR1	28	451	0.0621	265	10.57	1609	0.1647
1996	211	Vesper Sparrow	POGR1	17	66	0.2576	265	6.42	1609	0.1647
1996	212	Vesper Sparrow	POGR1	13	118	0.1102	265	4.91	1609	0.1647
1996	230	Vesper Sparrow	POGR1	26	186	0.1398	265	9.81	1609	0.1647
1996	322	Vesper Sparrow	POGR1	34	119	0.2857	265	12.83	1609	0.1647
1996	323	Vesper Sparrow	POGR1	108	210	0.5143	265	40.75	1609	0.1647
1996	324	Vesper Sparrow	POGR1	6	35	0.1714	265	2.26	1609	0.1647
1996	410	Vesper Sparrow	POGR1	1	5	0.2000	265	0.38	1609	0.1647
1996	530	Vesper Sparrow	POGR1	1	3	0.3333	265	0.38	1609	0.1647
1996	10	Western Meadowlark	STNE1	24	79	0.3038	245	9.80	1609	0.1523
1996	20	Western Meadowlark	STNE1	4	60	0.0667	245	1.63	1609	0.1523
1996	30	Western Meadowlark	STNE1	8	132	0.0606	245	3.27	1609	0.1523

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	110	Western Meadowlark	STNE1	77	451	0.1707	245	31.43	1609	0.1523
1996	211	Western Meadowlark	STNE1	17	66	0.2576	245	6.94	1609	0.1523
1996	212	Western Meadowlark	STNE1	18	118	0.1525	245	7.35	1609	0.1523
1996	230	Western Meadowlark	STNE1	15	186	0.0806	245	6.12	1609	0.1523
1996	322	Western Meadowlark	STNE1	23	119	0.1933	245	9.39	1609	0.1523
1996	323	Western Meadowlark	STNE1	49	210	0.2333	245	20.00	1609	0.1523
1996	324	Western Meadowlark	STNE1	8	35	0.2286	245	3.27	1609	0.1523
1996	420	Western Meadowlark	STNE1	1	3	0.3333	245	0.41	1609	0.1523
1996	540	Western Meadowlark	STNE1	1	11	0.0909	245	0.41	1609	0.1523
1996	10	Cliff Swallow	HIPY1	4	79	0.0506	167	2.40	1609	0.1038
1996	20	Cliff Swallow	HIPY1	13	60	0.2167	167	7.78	1609	0.1038
1996	30	Cliff Swallow	HIPY1	4	132	0.0303	167	2.40	1609	0.1038
1996	54	Cliff Swallow	HIPY1	5	85	0.0588	167	2.99	1609	0.1038
1996	110	Cliff Swallow	HIPY1	100	451	0.2217	167	59.88	1609	0.1038
1996	211	Cliff Swallow	HIPY1	5	66	0.0758	167	2.99	1609	0.1038
1996	212	Cliff Swallow	HIPY1	3	118	0.0254	167	1.80	1609	0.1038
1996	220	Cliff Swallow	HIPY1	4	4	1.0000	167	2.40	1609	0.1038
1996	230	Cliff Swallow	HIPY1	6	186	0.0323	167	3.59	1609	0.1038
1996	322	Cliff Swallow	HIPY1	3	119	0.0252	167	1.80	1609	0.1038
1996	323	Cliff Swallow	HIPY1	13	210	0.0619	167	7.78	1609	0.1038
1996	324	Cliff Swallow	HIPY1	4	35	0.1143	167	2.40	1609	0.1038
1996	410	Cliff Swallow	HIPY1	3	5	0.6000	167	1.80	1609	0.1038
1996	10	American Goldfinch	CATR1	3	79	0.0380	140	2.14	1609	0.0870
1996	20	American Goldfinch	CATR1	3	60	0.0500	140	2.14	1609	0.0870
1996	54	American Goldfinch	CATR1	3	85	0.0353	140	2.14	1609	0.0870
1996	93	American Goldfinch	CATR1	5	32	0.1563	140	3.57	1609	0.0870
1996	110	American Goldfinch	CATR1	67	451	0.1486	140	47.86	1609	0.0870
1996	211	American Goldfinch	CATR1	2	66	0.0303	140	1.43	1609	0.0870
1996	212	American Goldfinch	CATR1	14	118	0.1186	140	10.00	1609	0.0870
1996	230	American Goldfinch	CATR1	31	186	0.1667	140	22.14	1609	0.0870
1996	322	American Goldfinch	CATR1	6	119	0.0504	140	4.29	1609	0.0870
1996	324	American Goldfinch	CATR1	2	35	0.0571	140	1.43	1609	0.0870
1996	540	American Goldfinch	CATR1	4	11	0.3636	140	2.86	1609	0.0870
1996	10	Song Sparrow	MEME2	2	79	0.0253	127	1.57	1609	0.0789
1996	20	Song Sparrow	MEME2	5	60	0.0833	127	3.94	1609	0.0789
1996	30	Song Sparrow	MEME2	20	132	0.1515	127	15.75	1609	0.0789
1996	93	Song Sparrow	MEME2	4	32	0.1250	127	3.15	1609	0.0789

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	110	Song Sparrow	MEME2	36	451	0.0798	127	28.35	1609	0.0789
1996	211	Song Sparrow	MEME2	7	66	0.1061	127	5.51	1609	0.0789
1996	212	Song Sparrow	MEME2	33	118	0.2797	127	25.98	1609	0.0789
1996	230	Song Sparrow	MEME2	20	186	0.1075	127	15.75	1609	0.0789
1996	10	Barn Swallow	HIRU1	3	79	0.0380	110	2.73	1609	0.0684
1996	20	Barn Swallow	HIRU1	11	60	0.1833	110	10.00	1609	0.0684
1996	30	Barn Swallow	HIRU1	17	132	0.1288	110	15.45	1609	0.0684
1996	54	Barn Swallow	HIRU1	10	85	0.1176	110	9.09	1609	0.0684
1996	110	Barn Swallow	HIRU1	33	451	0.0732	110	30.00	1609	0.0684
1996	211	Barn Swallow	HIRU1	1	66	0.0152	110	0.91	1609	0.0684
1996	212	Barn Swallow	HIRU1	16	118	0.1356	110	14.55	1609	0.0684
1996	230	Barn Swallow	HIRU1	5	186	0.0269	110	4.55	1609	0.0684
1996	322	Barn Swallow	HIRU1	7	119	0.0588	110	6.36	1609	0.0684
1996	323	Barn Swallow	HIRU1	3	210	0.0143	110	2.73	1609	0.0684
1996	324	Barn Swallow	HIRU1	4	35	0.1143	110	3.64	1609	0.0684
1996	10	Mourning Dove	ZEMA1	5	79	0.0633	98	5.10	1609	0.0609
1996	20	Mourning Dove	ZEMA1	2	60	0.0333	98	2.04	1609	0.0609
1996	30	Mourning Dove	ZEMA1	3	132	0.0227	98	3.06	1609	0.0609
1996	93	Mourning Dove	ZEMA1	11	32	0.3438	98	11.22	1609	0.0609
1996	110	Mourning Dove	ZEMA1	40	451	0.0887	98	40.82	1609	0.0609
1996	212	Mourning Dove	ZEMA1	5	118	0.0424	98	5.10	1609	0.0609
1996	230	Mourning Dove	ZEMA1	1	186	0.0054	98	1.02	1609	0.0609
1996	322	Mourning Dove	ZEMA1	8	119	0.0672	98	8.16	1609	0.0609
1996	323	Mourning Dove	ZEMA1	8	210	0.0381	98	8.16	1609	0.0609
1996	324	Mourning Dove	ZEMA1	1	35	0.0286	98	1.02	1609	0.0609
1996	420	Mourning Dove	ZEMA1	2	3	0.6667	98	2.04	1609	0.0609
1996	530	Mourning Dove	ZEMA1	7	3	2.3333	98	7.14	1609	0.0609
1996	540	Mourning Dove	ZEMA1	5	11	0.4545	98	5.10	1609	0.0609
1996	20	American Robin	TUMI1	2	60	0.0333	81	2.47	1609	0.0503
1996	110	American Robin	TUMI1	23	451	0.0510	81	28.40	1609	0.0503
1996	211	American Robin	TUMI1	1	66	0.0152	81	1.23	1609	0.0503
1996	212	American Robin	TUMI1	1	118	0.0085	81	1.23	1609	0.0503
1996	230	American Robin	TUMI1	54	186	0.2903	81	66.67	1609	0.0503
1996	10	Lesser Goldfinch	CAPS1	3	79	0.0380	72	4.17	1609	0.0447
1996	93	Lesser Goldfinch	CAPS1	9	32	0.2813	72	12.50	1609	0.0447
1996	110	Lesser Goldfinch	CAPS1	18	451	0.0399	72	25.00	1609	0.0447
1996	211	Lesser Goldfinch	CAPS1	1	66	0.0152	72	1.39	1609	0.0447

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	212	Lesser Goldfinch	CAPS1	4	118	0.0339	72	5.56	1609	0.0447
1996	230	Lesser Goldfinch	CAPS1	37	186	0.1989	72	51.39	1609	0.0447
1996	10	Northern Oriole	ICGA1	1	79	0.0127	60	1.67	1609	0.0373
1996	30	Northern Oriole	ICGA1	1	132	0.0076	60	1.67	1609	0.0373
1996	110	Northern Oriole	ICGA1	44	451	0.0976	60	73.33	1609	0.0373
1996	212	Northern Oriole	ICGA1	3	118	0.0254	60	5.00	1609	0.0373
1996	230	Northern Oriole	ICGA1	10	186	0.0538	60	16.67	1609	0.0373
1996	322	Northern Oriole	ICGA1	1	119	0.0084	60	1.67	1609	0.0373
1996	110	Rufous-sided Towhee	PIER1	2	451	0.0044	58	3.45	1609	0.0360
1996	230	Rufous-sided Towhee	PIER1	56	186	0.3011	58	96.55	1609	0.0360
1996	10	Western Kingbird	TYVE1	2	79	0.0253	52	3.85	1609	0.0323
1996	110	Western Kingbird	TYVE1	38	451	0.0843	52	73.08	1609	0.0323
1996	212	Western Kingbird	TYVE1	5	118	0.0424	52	9.62	1609	0.0323
1996	322	Western Kingbird	TYVE1	1	119	0.0084	52	1.92	1609	0.0323
1996	323	Western Kingbird	TYVE1	1	210	0.0048	52	1.92	1609	0.0323
1996	324	Western Kingbird	TYVE1	5	35	0.1429	52	9.62	1609	0.0323
1996	93	Black-billed Magpie	PIPI1	1	32	0.0313	51	1.96	1609	0.0317
1996	110	Black-billed Magpie	PIPI1	9	451	0.0200	51	17.65	1609	0.0317
1996	212	Black-billed Magpie	PIPI1	1	118	0.0085	51	1.96	1609	0.0317
1996	230	Black-billed Magpie	PIPI1	40	186	0.2151	51	78.43	1609	0.0317
1996	10	Grasshopper Sparrow	AMSA1	3	79	0.0380	48	6.25	1609	0.0298
1996	20	Grasshopper Sparrow	AMSA1	1	60	0.0167	48	2.08	1609	0.0298
1996	30	Grasshopper Sparrow	AMSA1	5	132	0.0379	48	10.42	1609	0.0298
1996	110	Grasshopper Sparrow	AMSA1	2	451	0.0044	48	4.17	1609	0.0298
1996	211	Grasshopper Sparrow	AMSA1	3	66	0.0455	48	6.25	1609	0.0298
1996	212	Grasshopper Sparrow	AMSA1	3	118	0.0254	48	6.25	1609	0.0298
1996	230	Grasshopper Sparrow	AMSA1	1	186	0.0054	48	2.08	1609	0.0298
1996	322	Grasshopper Sparrow	AMSA1	11	119	0.0924	48	22.92	1609	0.0298
1996	323	Grasshopper Sparrow	AMSA1	19	210	0.0905	48	39.58	1609	0.0298
1996	30	Yellow-headed Blackbird	XAXA1	24	132	0.1818	39	61.54	1609	0.0242
1996	54	Yellow-headed Blackbird	XAXA1	4	85	0.0471	39	10.26	1609	0.0242
1996	93	Yellow-headed Blackbird	XAXA1	1	32	0.0313	39	2.56	1609	0.0242
1996	110	Yellow-headed Blackbird	XAXA1	2	451	0.0044	39	5.13	1609	0.0242
1996	212	Yellow-headed Blackbird	XAXA1	8	118	0.0678	39	20.51	1609	0.0242
1996	110	Sage Thrasher	ORMO1	3	451	0.0067	30	10.00	1609	0.0186
1996	212	Sage Thrasher	ORMO1	1	118	0.0085	30	3.33	1609	0.0186
1996	230	Sage Thrasher	ORMO1	24	186	0.1290	30	80.00	1609	0.0186

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	530	Sage Thrasher	ORMO1	1	3	0.3333	30	3.33	1609	0.0186
1996	540	Sage Thrasher	ORMO1	1	11	0.0909	30	3.33	1609	0.0186
1996	30	Yellow Warbler	DEPE1	1	132	0.0076	28	3.57	1609	0.0174
1996	110	Yellow Warbler	DEPE1	24	451	0.0532	28	85.71	1609	0.0174
1996	211	Yellow Warbler	DEPE1	1	66	0.0152	28	3.57	1609	0.0174
1996	212	Yellow Warbler	DEPE1	1	118	0.0085	28	3.57	1609	0.0174
1996	230	Yellow Warbler	DEPE1	1	186	0.0054	28	3.57	1609	0.0174
1996	10	Say's Phoebe	SASA1	1	79	0.0127	25	4.00	1609	0.0155
1996	30	Black-capped Chickadee	PAAT1	2	132	0.0152	25	8.00	1609	0.0155
1996	30	Say's Phoebe	SASA1	1	132	0.0076	25	4.00	1609	0.0155
1996	110	Black-capped Chickadee	PAAT1	6	451	0.0133	25	24.00	1609	0.0155
1996	110	Say's Phoebe	SASA1	11	451	0.0244	25	44.00	1609	0.0155
1996	211	Say's Phoebe	SASA1	2	66	0.0303	25	8.00	1609	0.0155
1996	212	Say's Phoebe	SASA1	2	118	0.0169	25	8.00	1609	0.0155
1996	230	Black-capped Chickadee	PAAT1	17	186	0.0914	25	68.00	1609	0.0155
1996	230	Say's Phoebe	SASA1	2	186	0.0108	25	8.00	1609	0.0155
1996	323	Say's Phoebe	SASA1	4	210	0.0190	25	16.00	1609	0.0155
1996	324	Say's Phoebe	SASA1	1	35	0.0286	25	4.00	1609	0.0155
1996	540	Say's Phoebe	SASA1	1	11	0.0909	25	4.00	1609	0.0155
1996	20	Common Yellowthroat	GETR1	1	60	0.0167	23	4.35	1609	0.0143
1996	30	Common Yellowthroat	GETR1	16	132	0.1212	23	69.57	1609	0.0143
1996	110	Common Yellowthroat	GETR1	3	451	0.0067	23	13.04	1609	0.0143
1996	212	Common Yellowthroat	GETR1	3	118	0.0254	23	13.04	1609	0.0143
1996	110	Brewer's Blackbird	EUCY1	19	451	0.0421	20	95.00	1609	0.0124
1996	420	Brewer's Blackbird	EUCY1	1	3	0.3333	20	5.00	1609	0.0124
1996	10	Pine Siskin	CAPI1	1	79	0.0127	14	7.14	1609	0.0087
1996	30	Pine Siskin	CAPI1	1	132	0.0076	14	7.14	1609	0.0087
1996	30	Brown-headed Cowbird	MOAT1	1	132	0.0076	14	7.14	1609	0.0087
1996	110	Pine Siskin	CAPI1	3	451	0.0067	14	21.43	1609	0.0087
1996	110	Brown-headed Cowbird	MOAT1	6	451	0.0133	14	42.86	1609	0.0087
1996	212	Pine Siskin	CAPI1	6	118	0.0508	14	42.86	1609	0.0087
1996	212	Brown-headed Cowbird	MOAT1	1	118	0.0085	14	7.14	1609	0.0087
1996	230	Pine Siskin	CAPI1	3	186	0.0161	14	21.43	1609	0.0087
1996	230	Brown-headed Cowbird	MOAT1	4	186	0.0215	14	28.57	1609	0.0087
1996	323	Brown-headed Cowbird	MOAT1	2	210	0.0095	14	14.29	1609	0.0087

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	110	Blue Grosbeak	GUCA1	7	451	0.0155	12	58.33	1609	0.0075
1996	211	Blue Grosbeak	GUCA1	3	66	0.0455	12	25.00	1609	0.0075
1996	212	Blue Grosbeak	GUCA1	2	118	0.0169	12	16.67	1609	0.0075
1996	230	Yellow-breasted Chat	ICVI1	9	186	0.0484	9	100.00	1609	0.0056
1996	93	Rock Dove	COLI1	7	32	0.2188	7	100.00	1609	0.0044
1996	230	Horned Lark	ERAL1	2	186	0.0108	6	33.33	1609	0.0037
1996	322	Horned Lark	ERAL1	2	119	0.0168	6	33.33	1609	0.0037
1996	323	Horned Lark	ERAL1	2	210	0.0095	6	33.33	1609	0.0037
1996	10	Chipping Sparrow	SPPA1	1	79	0.0127	4	25.00	1609	0.0025
1996	110	Eastern Phoebe	SAPH1	3	451	0.0067	4	75.00	1609	0.0025
1996	211	Eastern Phoebe	SAPH1	1	66	0.0152	4	25.00	1609	0.0025
1996	323	Chipping Sparrow	SPPA1	3	210	0.0143	4	75.00	1609	0.0025
1996	93	House Wren	TRAE1	1	32	0.0313	3	33.33	1609	0.0019
1996	110	Northern mockingbird	MIPO1	2	451	0.0044	3	66.67	1609	0.0019
1996	110	Broad-tailed Hummingbird	SEPL1	1	451	0.0022	3	33.33	1609	0.0019
1996	110	House Wren	TRAE1	1	451	0.0022	3	33.33	1609	0.0019
1996	212	Northern Flicker	COAU1	1	118	0.0085	3	33.33	1609	0.0019
1996	212	Northern mockingbird	MIPO1	1	118	0.0085	3	33.33	1609	0.0019
1996	230	Northern Flicker	COAU1	2	186	0.0108	3	66.67	1609	0.0019
1996	230	Green-tailed Towhee	PICH1	3	186	0.0161	3	100.00	1609	0.0019
1996	230	House Wren	TRAE1	1	186	0.0054	3	33.33	1609	0.0019
1996	322	Broad-tailed Hummingbird	SEPL1	1	119	0.0084	3	33.33	1609	0.0019
1996	323	Broad-tailed Hummingbird	SEPL1	1	210	0.0048	3	33.33	1609	0.0019
1996	93	Common Grackle	QUQU1	2	32	0.0625	2	100.00	1609	0.0012
1996	110	Common Nighthawk	CHMI1	1	451	0.0022	2	50.00	1609	0.0012
1996	110	Eastern Kingbird	TYTY1	2	451	0.0044	2	100.00	1609	0.0012
1996	324	Common Nighthawk	CHMI1	1	35	0.0286	2	50.00	1609	0.0012
1996	110	Ovenbird	SEAU1	1	451	0.0022	1	100.00	1609	0.0006
1996	110	Violet-green Swallow	TATH1	1	451	0.0022	1	100.00	1609	0.0006
1996	212	Common Raven	COCO1	1	118	0.0085	1	100.00	1609	0.0006
1996	212	Yellow-rumped Warbler	DECO1	1	118	0.0085	1	100.00	1609	0.0006
1996	212	MacGillivray's Warbler	OPTO1	1	118	0.0085	1	100.00	1609	0.0006
1996	212	Lazuli Bunting	PAAM1	1	118	0.0085	1	100.00	1609	0.0006

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	10	House Finch	CAME2	3	177	0.0169	346	0.87	2269	0.1525
1995	20	House Finch	CAME2	4	102	0.0392	346	1.16	2269	0.1525
1995	54	House Finch	CAME2	1	77	0.0130	346	0.29	2269	0.1525
1995	110	House Finch	CAME2	119	312	0.3814	346	34.39	2269	0.1525
1995	210	House Finch	CAME2	2	4	0.5000	346	0.58	2269	0.1525
1995	211	House Finch	CAME2	1	38	0.0263	346	0.29	2269	0.1525
1995	212	House Finch	CAME2	96	753	0.1275	346	27.75	2269	0.1525
1995	230	House Finch	CAME2	44	288	0.1528	346	12.72	2269	0.1525
1995	322	House Finch	CAME2	51	299	0.1706	346	14.74	2269	0.1525
1995	324	House Finch	CAME2	10	27	0.3704	346	2.89	2269	0.1525
1995	510	House Finch	CAME2	2	7	0.2857	346	0.58	2269	0.1525
1995	560	House Finch	CAME2	13	6	2.1667	346	3.76	2269	0.1525
1995	10	Red-winged Blackbird	AGPH1	2	177	0.0113	261	0.77	2269	0.1150
1995	20	Red-winged Blackbird	AGPH1	25	102	0.2451	261	9.58	2269	0.1150
1995	30	Red-winged Blackbird	AGPH1	100	109	0.9174	261	38.31	2269	0.1150
1995	54	Red-winged Blackbird	AGPH1	15	77	0.1948	261	5.75	2269	0.1150
1995	93	Red-winged Blackbird	AGPH1	6	16	0.3750	261	2.30	2269	0.1150
1995	110	Red-winged Blackbird	AGPH1	17	312	0.0545	261	6.51	2269	0.1150
1995	211	Red-winged Blackbird	AGPH1	8	38	0.2105	261	3.07	2269	0.1150
1995	212	Red-winged Blackbird	AGPH1	29	753	0.0385	261	11.11	2269	0.1150
1995	230	Red-winged Blackbird	AGPH1	20	288	0.0694	261	7.66	2269	0.1150
1995	322	Red-winged Blackbird	AGPH1	19	299	0.0635	261	7.28	2269	0.1150
1995	324	Red-winged Blackbird	AGPH1	18	27	0.6667	261	6.90	2269	0.1150
1995	530	Red-winged Blackbird	AGPH1	2	12	0.1667	261	0.77	2269	0.1150
1995	20	Cliff Swallow	HIPY1	5	102	0.0490	242	2.07	2269	0.1067
1995	30	Cliff Swallow	HIPY1	7	109	0.0642	242	2.89	2269	0.1067
1995	54	Cliff Swallow	HIPY1	50	77	0.6494	242	20.66	2269	0.1067
1995	110	Cliff Swallow	HIPY1	48	312	0.1538	242	19.83	2269	0.1067
1995	210	Cliff Swallow	HIPY1	11	4	2.7500	242	4.55	2269	0.1067
1995	211	Cliff Swallow	HIPY1	3	38	0.0789	242	1.24	2269	0.1067
1995	212	Cliff Swallow	HIPY1	16	753	0.0212	242	6.61	2269	0.1067
1995	230	Cliff Swallow	HIPY1	10	288	0.0347	242	4.13	2269	0.1067
1995	322	Cliff Swallow	HIPY1	19	299	0.0635	242	7.85	2269	0.1067
1995	324	Cliff Swallow	HIPY1	3	27	0.1111	242	1.24	2269	0.1067
1995	540	Cliff Swallow	HIPY1	70	1	70.0000	242	28.93	2269	0.1067
1995	10	Vesper Sparrow	POGR1	1	177	0.0056	153	0.65	2269	0.0674
1995	20	Vesper Sparrow	POGR1	1	102	0.0098	153	0.65	2269	0.0674

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	30	Vesper Sparrow	POGR1	1	109	0.0092	153	0.65	2269	0.0674
1995	54	Vesper Sparrow	POGR1	1	77	0.0130	153	0.65	2269	0.0674
1995	110	Vesper Sparrow	POGR1	11	312	0.0353	153	7.19	2269	0.0674
1995	211	Vesper Sparrow	POGR1	6	38	0.1579	153	3.92	2269	0.0674
1995	212	Vesper Sparrow	POGR1	9	753	0.0120	153	5.88	2269	0.0674
1995	230	Vesper Sparrow	POGR1	43	288	0.1493	153	28.10	2269	0.0674
1995	322	Vesper Sparrow	POGR1	70	299	0.2341	153	45.75	2269	0.0674
1995	323	Vesper Sparrow	POGR1	6	18	0.3333	153	3.92	2269	0.0674
1995	324	Vesper Sparrow	POGR1	1	27	0.0370	153	0.65	2269	0.0674
1995	520	Vesper Sparrow	POGR1	1	1	1.0000	153	0.65	2269	0.0674
1995	560	Vesper Sparrow	POGR1	2	6	0.3333	153	1.31	2269	0.0674
1995	20	American Goldfinch	CATR1	2	102	0.0196	151	1.32	2269	0.0665
1995	30	American Goldfinch	CATR1	2	109	0.0183	151	1.32	2269	0.0665
1995	110	American Goldfinch	CATR1	68	312	0.2179	151	45.03	2269	0.0665
1995	211	American Goldfinch	CATR1	1	38	0.0263	151	0.66	2269	0.0665
1995	212	American Goldfinch	CATR1	23	753	0.0305	151	15.23	2269	0.0665
1995	230	American Goldfinch	CATR1	51	288	0.1771	151	33.77	2269	0.0665
1995	322	American Goldfinch	CATR1	2	299	0.0067	151	1.32	2269	0.0665
1995	324	American Goldfinch	CATR1	2	27	0.0741	151	1.32	2269	0.0665
1995	20	Western Meadowlark	STNE1	6	102	0.0588	137	4.38	2269	0.0604
1995	30	Western Meadowlark	STNE1	4	109	0.0367	137	2.92	2269	0.0604
1995	54	Western Meadowlark	STNE1	1	77	0.0130	137	0.73	2269	0.0604
1995	93	Western Meadowlark	STNE1	1	16	0.0625	137	0.73	2269	0.0604
1995	110	Western Meadowlark	STNE1	25	312	0.0801	137	18.25	2269	0.0604
1995	211	Western Meadowlark	STNE1	7	38	0.1842	137	5.11	2269	0.0604
1995	212	Western Meadowlark	STNE1	10	753	0.0133	137	7.30	2269	0.0604
1995	230	Western Meadowlark	STNE1	15	288	0.0521	137	10.95	2269	0.0604
1995	322	Western Meadowlark	STNE1	65	299	0.2174	137	47.45	2269	0.0604
1995	324	Western Meadowlark	STNE1	3	27	0.1111	137	2.19	2269	0.0604
1995	110	European Starling	STVU1	78	312	0.2500	136	57.35	2269	0.0599
1995	212	European Starling	STVU1	3	753	0.0040	136	2.21	2269	0.0599
1995	322	European Starling	STVU1	34	299	0.1137	136	25.00	2269	0.0599
1995	324	European Starling	STVU1	20	27	0.7407	136	14.71	2269	0.0599
1995	560	European Starling	STVU1	1	6	0.1667	136	0.74	2269	0.0599
1995	20	Barn Swallow	HIRU1	11	102	0.1078	98	11.22	2269	0.0432
1995	30	Barn Swallow	HIRU1	11	109	0.1009	98	11.22	2269	0.0432
1995	54	Barn Swallow	HIRU1	7	77	0.0909	98	7.14	2269	0.0432

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	110	Barn Swallow	HIRU1	25	312	0.0801	98	25.51	2269	0.0432
1995	210	Barn Swallow	HIRU1	2	4	0.5000	98	2.04	2269	0.0432
1995	211	Barn Swallow	HIRU1	3	38	0.0789	98	3.06	2269	0.0432
1995	212	Barn Swallow	HIRU1	11	753	0.0146	98	11.22	2269	0.0432
1995	230	Barn Swallow	HIRU1	9	288	0.0313	98	9.18	2269	0.0432
1995	322	Barn Swallow	HIRU1	12	299	0.0401	98	12.24	2269	0.0432
1995	324	Barn Swallow	HIRU1	3	27	0.1111	98	3.06	2269	0.0432
1995	530	Barn Swallow	HIRU1	4	12	0.3333	98	4.08	2269	0.0432
1995	10	Mourning Dove	ZEMA1	1	177	0.0056	92	1.09	2269	0.0405
1995	20	Mourning Dove	ZEMA1	1	102	0.0098	92	1.09	2269	0.0405
1995	30	Mourning Dove	ZEMA1	3	109	0.0275	92	3.26	2269	0.0405
1995	110	Mourning Dove	ZEMA1	58	312	0.1859	92	63.04	2269	0.0405
1995	120	Mourning Dove	ZEMA1	1	2	0.5000	92	1.09	2269	0.0405
1995	210	Mourning Dove	ZEMA1	1	4	0.2500	92	1.09	2269	0.0405
1995	211	Mourning Dove	ZEMA1	1	38	0.0263	92	1.09	2269	0.0405
1995	212	Mourning Dove	ZEMA1	3	753	0.0040	92	3.26	2269	0.0405
1995	230	Mourning Dove	ZEMA1	18	288	0.0625	92	19.57	2269	0.0405
1995	322	Mourning Dove	ZEMA1	2	299	0.0067	92	2.17	2269	0.0405
1995	323	Mourning Dove	ZEMA1	1	18	0.0556	92	1.09	2269	0.0405
1995	510	Mourning Dove	ZEMA1	1	7	0.1429	92	1.09	2269	0.0405
1995	530	Mourning Dove	ZEMA1	1	12	0.0833	92	1.09	2269	0.0405
1995	20	Song Sparrow	MEME2	13	102	0.1275	67	19.40	2269	0.0295
1995	30	Song Sparrow	MEME2	6	109	0.0550	67	8.96	2269	0.0295
1995	93	Song Sparrow	MEME2	1	16	0.0625	67	1.49	2269	0.0295
1995	110	Song Sparrow	MEME2	13	312	0.0417	67	19.40	2269	0.0295
1995	210	Song Sparrow	MEME2	1	4	0.2500	67	1.49	2269	0.0295
1995	212	Song Sparrow	MEME2	8	753	0.0106	67	11.94	2269	0.0295
1995	230	Song Sparrow	MEME2	25	288	0.0868	67	37.31	2269	0.0295
1995	110	Rufous-sided Towhee	PIER1	1	312	0.0032	60	1.67	2269	0.0264
1995	230	Rufous-sided Towhee	PIER1	59	288	0.2049	60	98.33	2269	0.0264
1995	110	Northern Oriole	ICGA1	35	312	0.1122	55	63.64	2269	0.0242
1995	211	Northern Oriole	ICGA1	1	38	0.0263	55	1.82	2269	0.0242
1995	212	Northern Oriole	ICGA1	11	753	0.0146	55	20.00	2269	0.0242
1995	230	Northern Oriole	ICGA1	7	288	0.0243	55	12.73	2269	0.0242
1995	322	Northern Oriole	ICGA1	1	299	0.0033	55	1.82	2269	0.0242
1995	110	Black-billed Magpie	PIPI1	7	312	0.0224	33	21.21	2269	0.0145
1995	120	Black-billed Magpie	PIPI1	2	2	1.0000	33	6.06	2269	0.0145

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	230	Black-billed Magpie	PIPI1	23	288	0.0799	33	69.70	2269	0.0145
1995	322	Black-billed Magpie	PIPI1	1	299	0.0033	33	3.03	2269	0.0145
1995	20	American Robin	TUMI1	1	102	0.0098	31	3.23	2269	0.0137
1995	110	American Robin	TUMI1	18	312	0.0577	31	58.06	2269	0.0137
1995	212	American Robin	TUMI1	1	753	0.0013	31	3.23	2269	0.0137
1995	230	American Robin	TUMI1	10	288	0.0347	31	32.26	2269	0.0137
1995	322	American Robin	TUMI1	1	299	0.0033	31	3.23	2269	0.0137
1995	110	Yellow Warbler	DEPE1	20	312	0.0641	27	74.07	2269	0.0119
1995	212	Yellow Warbler	DEPE1	5	753	0.0066	27	18.52	2269	0.0119
1995	230	Yellow Warbler	DEPE1	2	288	0.0069	27	7.41	2269	0.0119
1995	20	Grasshopper Sparrow	AMSA1	2	102	0.0196	25	8.00	2269	0.0110
1995	30	Grasshopper Sparrow	AMSA1	2	109	0.0183	25	8.00	2269	0.0110
1995	211	Grasshopper Sparrow	AMSA1	1	38	0.0263	25	4.00	2269	0.0110
1995	230	Grasshopper Sparrow	AMSA1	1	288	0.0035	25	4.00	2269	0.0110
1995	322	Grasshopper Sparrow	AMSA1	19	299	0.0635	25	76.00	2269	0.0110
1995	110	Brown-headed Cowbird	MOAT1	4	312	0.0128	17	23.53	2269	0.0075
1995	212	Brown-headed Cowbird	MOAT1	1	753	0.0013	17	5.88	2269	0.0075
1995	230	Brown-headed Cowbird	MOAT1	12	288	0.0417	17	70.59	2269	0.0075
1995	110	Western Kingbird	TYVE1	10	312	0.0321	16	62.50	2269	0.0071
1995	212	Western Kingbird	TYVE1	2	753	0.0027	16	12.50	2269	0.0071
1995	322	Western Kingbird	TYVE1	2	299	0.0067	16	12.50	2269	0.0071
1995	540	Western Kingbird	TYVE1	1	1	1.0000	16	6.25	2269	0.0071
1995	560	Western Kingbird	TYVE1	1	6	0.1667	16	6.25	2269	0.0071
1995	20	Common Yellowthroat	GETR1	1	102	0.0098	14	7.14	2269	0.0062
1995	30	Common Yellowthroat	GETR1	9	109	0.0826	14	64.29	2269	0.0062
1995	110	Blue Grosbeak	GUCA1	7	312	0.0224	14	50.00	2269	0.0062
1995	212	Blue Grosbeak	GUCA1	2	753	0.0027	14	14.29	2269	0.0062
1995	230	Common Yellowthroat	GETR1	4	288	0.0139	14	28.57	2269	0.0062
1995	230	Blue Grosbeak	GUCA1	5	288	0.0174	14	35.71	2269	0.0062
1995	230	Black-capped Chickadee	PAAT1	14	288	0.0486	14	100.00	2269	0.0062
1995	110	Brewer's Blackbird	EUCY1	6	312	0.0192	13	46.15	2269	0.0057
1995	110	Say's Phoebe	SASA1	7	312	0.0224	13	53.85	2269	0.0057
1995	212	Brewer's Blackbird	EUCY1	1	753	0.0013	13	7.69	2269	0.0057
1995	212	Say's Phoebe	SASA1	2	753	0.0027	13	15.38	2269	0.0057
1995	230	Brewer's Blackbird	EUCY1	6	288	0.0208	13	46.15	2269	0.0057

Table 3-23. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	230	Say's Phoebe	SASA1	1	288	0.0035	13	7.69	2269	0.0057
1995	322	Say's Phoebe	SASA1	3	299	0.0100	13	23.08	2269	0.0057
1995	110	Northern Flicker	COAU1	5	312	0.0160	9	55.56	2269	0.0040
1995	230	Northern Flicker	COAU1	3	288	0.0104	9	33.33	2269	0.0040
1995	510	Northern Flicker	COAU1	1	7	0.1429	9	11.11	2269	0.0040
1995	54	Yellow-headed Blackbird	XAXA1	8	77	0.1039	8	100.00	2269	0.0035
1995	110	Lesser Goldfinch	CAPS1	1	312	0.0032	6	16.67	2269	0.0026
1995	230	Lesser Goldfinch	CAPS1	5	288	0.0174	6	83.33	2269	0.0026
1995	230	Sage Thrasher	ORMO1	6	288	0.0208	6	100.00	2269	0.0026
1995	30	Common Nighthawk	CHMI1	1	109	0.0092	5	20.00	2269	0.0022
1995	110	Common Nighthawk	CHMI1	1	312	0.0032	5	20.00	2269	0.0022
1995	230	Common Nighthawk	CHMI1	1	288	0.0035	5	20.00	2269	0.0022
1995	322	Common Nighthawk	CHMI1	2	299	0.0067	5	40.00	2269	0.0022
1995	323	Lark Sparrow	CHGR1	4	18	0.2222	4	100.00	2269	0.0018
1995	110	Eastern Phoebe	SAPH1	1	312	0.0032	3	33.33	2269	0.0013
1995	110	Eastern Kingbird	TYTY1	2	312	0.0064	3	66.67	2269	0.0013
1995	212	Eastern Phoebe	SAPH1	1	753	0.0013	3	33.33	2269	0.0013
1995	230	Yellow-breasted Chat	ICVI1	3	288	0.0104	3	100.00	2269	0.0013
1995	230	Dark-eyed Junco	JUHY1	3	288	0.0104	3	100.00	2269	0.0013
1995	322	Horned Lark	ERAL1	3	299	0.0100	3	100.00	2269	0.0013
1995	322	Eastern Phoebe	SAPH1	1	299	0.0033	3	33.33	2269	0.0013
1995	560	Eastern Kingbird	TYTY1	1	6	0.1667	3	33.33	2269	0.0013
1995	20	Broad-tailed Hummingbird	SEPL1	1	102	0.0098	2	50.00	2269	0.0009
1995	110	House Wren	TRAE1	1	312	0.0032	2	50.00	2269	0.0009
1995	212	Broad-tailed Hummingbird	SEPL1	1	753	0.0013	2	50.00	2269	0.0009
1995	230	Green-tailed Towhee	PICH1	2	288	0.0069	2	100.00	2269	0.0009
1995	230	House Wren	TRAE1	1	288	0.0035	2	50.00	2269	0.0009
1995	110	Common Raven	COCO1	1	312	0.0032	1	100.00	2269	0.0004
1995	110	Wilson's Warbler	WIPU1	1	312	0.0032	1	100.00	2269	0.0004
1995	230	Western Wood-Pewee	COSO1	1	288	0.0035	1	100.00	2269	0.0004
1995	230	Chestnut-sided warbler	DEPE2	1	288	0.0035	1	100.00	2269	0.0004
1995	230	Loggerhead Shrike	LALU1	1	288	0.0035	1	100.00	2269	0.0004
1995	230	White-crowned Sparrow	ZOLE1	1	288	0.0035	1	100.00	2269	0.0004
1995	530	Common Grackle	QUQU1	1	12	0.0833	1	100.00	2269	0.0004

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-24. Migratory bird relative abundance in fall (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	20	Vesper Sparrow	POGR1	6	95	0.0632	164	3.66	1132	0.1449
2000	30	Vesper Sparrow	POGR1	6	87	0.0690	164	3.66	1132	0.1449
2000	110	Vesper Sparrow	POGR1	29	269	0.1078	164	17.68	1132	0.1449
2000	211	Vesper Sparrow	POGR1	3	28	0.1071	164	1.83	1132	0.1449
2000	212	Vesper Sparrow	POGR1	24	86	0.2791	164	14.63	1132	0.1449
2000	230	Vesper Sparrow	POGR1	11	169	0.0651	164	6.71	1132	0.1449
2000	322	Vesper Sparrow	POGR1	32	128	0.2500	164	19.51	1132	0.1449
2000	323	Vesper Sparrow	POGR1	50	117	0.4274	164	30.49	1132	0.1449
2000	530	Vesper Sparrow	POGR1	2	1	2.0000	164	1.22	1132	0.1449
2000	540	Vesper Sparrow	POGR1	1	8	0.1250	164	0.61	1132	0.1449
2000	30	House Finch	CAME2	2	87	0.0230	119	1.68	1132	0.1051
2000	110	House Finch	CAME2	37	269	0.1375	119	31.09	1132	0.1051
2000	212	House Finch	CAME2	9	86	0.1047	119	7.56	1132	0.1051
2000	230	House Finch	CAME2	54	169	0.3195	119	45.38	1132	0.1051
2000	322	House Finch	CAME2	2	128	0.0156	119	1.68	1132	0.1051
2000	324	House Finch	CAME2	15	10	1.5000	119	12.61	1132	0.1051
2000	30	Black-billed Magpie	PIPI1	5	87	0.0575	73	6.85	1132	0.0645
2000	110	Black-billed Magpie	PIPI1	32	269	0.1190	73	43.84	1132	0.0645
2000	212	Black-billed Magpie	PIPI1	14	86	0.1628	73	19.18	1132	0.0645
2000	230	Black-billed Magpie	PIPI1	13	169	0.0769	73	17.81	1132	0.0645
2000	322	Black-billed Magpie	PIPI1	3	128	0.0234	73	4.11	1132	0.0645
2000	324	Black-billed Magpie	PIPI1	3	10	0.3000	73	4.11	1132	0.0645
2000	540	Black-billed Magpie	PIPI1	3	8	0.3750	73	4.11	1132	0.0645
2000	20	Western Meadowlark	STNE1	1	95	0.0105	69	1.45	1132	0.0610
2000	30	Western Meadowlark	STNE1	4	87	0.0460	69	5.80	1132	0.0610
2000	54	Western Meadowlark	STNE1	1	113	0.0088	69	1.45	1132	0.0610
2000	93	Western Meadowlark	STNE1	2	5	0.4000	69	2.90	1132	0.0610
2000	110	Western Meadowlark	STNE1	15	269	0.0558	69	21.74	1132	0.0610
2000	211	Western Meadowlark	STNE1	4	28	0.1429	69	5.80	1132	0.0610
2000	230	Western Meadowlark	STNE1	18	169	0.1065	69	26.09	1132	0.0610
2000	322	Western Meadowlark	STNE1	7	128	0.0547	69	10.14	1132	0.0610
2000	323	Western Meadowlark	STNE1	13	117	0.1111	69	18.84	1132	0.0610
2000	324	Western Meadowlark	STNE1	4	10	0.4000	69	5.80	1132	0.0610
2000	30	Red-winged Blackbird	AGPH1	12	87	0.1379	55	21.82	1132	0.0486
2000	212	Red-winged Blackbird	AGPH1	3	86	0.0349	55	5.45	1132	0.0486
2000	324	Red-winged Blackbird	AGPH1	40	10	4.0000	55	72.73	1132	0.0486

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	110	European Starling	STVU1	24	269	0.0892	51	47.06	1132	0.0451
2000	230	European Starling	STVU1	27	169	0.1598	51	52.94	1132	0.0451
2000	20	Black-capped Chickadee	PAAT1	3	95	0.0316	33	9.09	1132	0.0292
2000	110	American Goldfinch	CATR1	11	269	0.0409	33	33.33	1132	0.0292
2000	110	Black-capped Chickadee	PAAT1	4	269	0.0149	33	12.12	1132	0.0292
2000	230	American Goldfinch	CATR1	22	169	0.1302	33	66.67	1132	0.0292
2000	230	Black-capped Chickadee	PAAT1	26	169	0.1538	33	78.79	1132	0.0292
2000	20	American Tree Sparrow	SPAR1	2	95	0.0211	29	6.90	1132	0.0256
2000	30	American Tree Sparrow	SPAR1	4	87	0.0460	29	13.79	1132	0.0256
2000	30	American Robin	TUMI1	1	87	0.0115	29	3.45	1132	0.0256
2000	110	American Tree Sparrow	SPAR1	10	269	0.0372	29	34.48	1132	0.0256
2000	211	American Tree Sparrow	SPAR1	1	28	0.0357	29	3.45	1132	0.0256
2000	212	American Tree Sparrow	SPAR1	5	86	0.0581	29	17.24	1132	0.0256
2000	230	American Tree Sparrow	SPAR1	4	169	0.0237	29	13.79	1132	0.0256
2000	230	American Robin	TUMI1	28	169	0.1657	29	96.55	1132	0.0256
2000	322	American Tree Sparrow	SPAR1	1	128	0.0078	29	3.45	1132	0.0256
2000	540	American Tree Sparrow	SPAR1	2	8	0.2500	29	6.90	1132	0.0256
2000	20	Song Sparrow	MEME2	1	95	0.0105	28	3.57	1132	0.0247
2000	30	Song Sparrow	MEME2	5	87	0.0575	28	17.86	1132	0.0247
2000	110	Song Sparrow	MEME2	5	269	0.0186	28	17.86	1132	0.0247
2000	212	Song Sparrow	MEME2	1	86	0.0116	28	3.57	1132	0.0247
2000	230	Song Sparrow	MEME2	16	169	0.0947	28	57.14	1132	0.0247
2000	20	Barn Swallow	HIRU1	4	95	0.0421	25	16.00	1132	0.0221
2000	30	Barn Swallow	HIRU1	1	87	0.0115	25	4.00	1132	0.0221
2000	54	Barn Swallow	HIRU1	7	113	0.0619	25	28.00	1132	0.0221
2000	110	Barn Swallow	HIRU1	7	269	0.0260	25	28.00	1132	0.0221
2000	230	Barn Swallow	HIRU1	6	169	0.0355	25	24.00	1132	0.0221
2000	110	White-crowned Sparrow	ZOLE1	7	269	0.0260	23	30.43	1132	0.0203
2000	230	White-crowned Sparrow	ZOLE1	16	169	0.0947	23	69.57	1132	0.0203
2000	110	Northern Flicker	COAU1	17	269	0.0632	21	80.95	1132	0.0186
2000	230	Northern Flicker	COAU1	3	169	0.0178	21	14.29	1132	0.0186
2000	322	Northern Flicker	COAU1	1	128	0.0078	21	4.76	1132	0.0186
2000	230	Horned Lark	ERAL1	1	169	0.0059	20	5.00	1132	0.0177
2000	323	Horned Lark	ERAL1	19	117	0.1624	20	95.00	1132	0.0177

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	110	Rock Wren	SAOB1	5	269	0.0186	17	29.41	1132	0.0150
2000	230	Rock Wren	SAOB1	2	169	0.0118	17	11.76	1132	0.0150
2000	322	Rock Wren	SAOB1	7	128	0.0547	17	41.18	1132	0.0150
2000	540	Rock Wren	SAOB1	3	8	0.3750	17	17.65	1132	0.0150
2000	230	Rufous-sided Towhee	PIER1	10	169	0.0592	10	100.00	1132	0.0088
2000	20	Say's Phoebe	SASA1	3	95	0.0316	8	37.50	1132	0.0071
2000	30	Say's Phoebe	SASA1	1	87	0.0115	8	12.50	1132	0.0071
2000	30	Mourning Dove	ZEMA1	1	87	0.0115	8	12.50	1132	0.0071
2000	110	Say's Phoebe	SASA1	1	269	0.0037	8	12.50	1132	0.0071
2000	110	Mourning Dove	ZEMA1	4	269	0.0149	8	50.00	1132	0.0071
2000	212	Mourning Dove	ZEMA1	1	86	0.0116	8	12.50	1132	0.0071
2000	230	Say's Phoebe	SASA1	2	169	0.0118	8	25.00	1132	0.0071
2000	230	Mourning Dove	ZEMA1	2	169	0.0118	8	25.00	1132	0.0071
2000	323	Say's Phoebe	SASA1	1	117	0.0085	8	12.50	1132	0.0071
2000	20	Cliff Swallow	HIPY1	2	95	0.0211	5	40.00	1132	0.0044
2000	230	Cliff Swallow	HIPY1	3	169	0.0178	5	60.00	1132	0.0044
2000	110	Dark-eyed Junco	JUHY1	2	269	0.0074	4	50.00	1132	0.0035
2000	230	Lesser Goldfinch	CAPS1	4	169	0.0237	4	100.00	1132	0.0035
2000	230	Dark-eyed Junco	JUHY1	2	169	0.0118	4	50.00	1132	0.0035
2000	230	Green-tailed Towhee	PICH1	4	169	0.0237	4	100.00	1132	0.0035
2000	110	Lark Sparrow	CHGR1	3	269	0.0112	3	100.00	1132	0.0027
2000	54	Belted Kingfisher	CEAL1	2	113	0.0177	2	100.00	1132	0.0018
2000	110	Yellow-rumped Warbler	DECO1	2	269	0.0074	2	100.00	1132	0.0018
2000	212	Pine Siskin	CAPI1	2	86	0.0233	2	100.00	1132	0.0018
2000	20	Northern Shrike	LAEX1	1	95	0.0105	1	100.00	1132	0.0009
2000	30	Common Yellowthroat	GETR1	1	87	0.0115	1	100.00	1132	0.0009
2000	110	Western Wood-Pewee	COSO1	1	269	0.0037	1	100.00	1132	0.0009
2000	110	Blue Jay	CYCR1	1	269	0.0037	1	100.00	1132	0.0009
2000	110	Blue-gray Gnatcatcher	POCA2	1	269	0.0037	1	100.00	1132	0.0009
2000	110	Eastern Phoebe	SAPH1	1	269	0.0037	1	100.00	1132	0.0009
2000	230	Sage Thrasher	ORMO1	1	169	0.0059	1	100.00	1132	0.0009
2000	230	Downy Woodpecker	PIPU1	1	169	0.0059	1	100.00	1132	0.0009
2000	230	Chipping Sparrow	SPPA1	1	169	0.0059	1	100.00	1132	0.0009
2000	323	Loggerhead Shrike	LALU1	1	117	0.0085	1	100.00	1132	0.0009

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	10	House Finch	CAME2	3	49	0.0612	83	3.61	1356	0.0612
1999	20	House Finch	CAME2	1	87	0.0115	83	1.20	1356	0.0612
1999	30	House Finch	CAME2	4	125	0.0320	83	4.82	1356	0.0612
1999	110	House Finch	CAME2	23	323	0.0712	83	27.71	1356	0.0612
1999	211	House Finch	CAME2	1	31	0.0323	83	1.20	1356	0.0612
1999	212	House Finch	CAME2	16	164	0.0976	83	19.28	1356	0.0612
1999	230	House Finch	CAME2	28	186	0.1505	83	33.73	1356	0.0612
1999	322	House Finch	CAME2	3	133	0.0226	83	3.61	1356	0.0612
1999	540	House Finch	CAME2	4	11	0.3636	83	4.82	1356	0.0612
1999	10	Black-billed Magpie	PIPI1	1	49	0.0204	81	1.23	1356	0.0597
1999	20	Black-billed Magpie	PIPI1	1	87	0.0115	81	1.23	1356	0.0597
1999	110	Black-billed Magpie	PIPI1	55	323	0.1703	81	67.90	1356	0.0597
1999	212	Black-billed Magpie	PIPI1	12	164	0.0732	81	14.81	1356	0.0597
1999	230	Black-billed Magpie	PIPI1	9	186	0.0484	81	11.11	1356	0.0597
1999	322	Black-billed Magpie	PIPI1	3	133	0.0226	81	3.70	1356	0.0597
1999	10	Western Meadowlark	STNE1	5	49	0.1020	63	7.94	1356	0.0465
1999	20	Western Meadowlark	STNE1	2	87	0.0230	63	3.17	1356	0.0465
1999	110	Western Meadowlark	STNE1	27	323	0.0836	63	42.86	1356	0.0465
1999	211	Western Meadowlark	STNE1	4	31	0.1290	63	6.35	1356	0.0465
1999	212	Western Meadowlark	STNE1	10	164	0.0610	63	15.87	1356	0.0465
1999	230	Western Meadowlark	STNE1	4	186	0.0215	63	6.35	1356	0.0465
1999	322	Western Meadowlark	STNE1	3	133	0.0226	63	4.76	1356	0.0465
1999	323	Western Meadowlark	STNE1	8	129	0.0620	63	12.70	1356	0.0465
1999	10	Vesper Sparrow	POGR1	1	49	0.0204	49	2.04	1356	0.0361
1999	20	Vesper Sparrow	POGR1	1	87	0.0115	49	2.04	1356	0.0361
1999	30	Vesper Sparrow	POGR1	1	125	0.0080	49	2.04	1356	0.0361
1999	110	Vesper Sparrow	POGR1	2	323	0.0062	49	4.08	1356	0.0361
1999	211	Vesper Sparrow	POGR1	4	31	0.1290	49	8.16	1356	0.0361
1999	212	Vesper Sparrow	POGR1	2	164	0.0122	49	4.08	1356	0.0361
1999	230	Vesper Sparrow	POGR1	5	186	0.0269	49	10.20	1356	0.0361
1999	322	Vesper Sparrow	POGR1	11	133	0.0827	49	22.45	1356	0.0361
1999	323	Vesper Sparrow	POGR1	18	129	0.1395	49	36.73	1356	0.0361
1999	530	Vesper Sparrow	POGR1	1	1	1.0000	49	2.04	1356	0.0361
1999	540	Vesper Sparrow	POGR1	3	11	0.2727	49	6.12	1356	0.0361

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	10	Song Sparrow	MEME2	1	49	0.0204	39	2.56	1356	0.0288
1999	20	Song Sparrow	MEME2	3	87	0.0345	39	7.69	1356	0.0288
1999	30	Song Sparrow	MEME2	11	125	0.0880	39	28.21	1356	0.0288
1999	110	Song Sparrow	MEME2	6	323	0.0186	39	15.38	1356	0.0288
1999	212	Song Sparrow	MEME2	1	164	0.0061	39	2.56	1356	0.0288
1999	230	Song Sparrow	MEME2	17	186	0.0914	39	43.59	1356	0.0288
1999	30	American Tree Sparrow	SPAR1	6	125	0.0480	35	17.14	1356	0.0258
1999	110	American Tree Sparrow	SPAR1	16	323	0.0495	35	45.71	1356	0.0258
1999	211	American Tree Sparrow	SPAR1	8	31	0.2581	35	22.86	1356	0.0258
1999	212	American Tree Sparrow	SPAR1	5	164	0.0305	35	14.29	1356	0.0258
1999	30	Barn Swallow	HIRU1	26	125	0.2080	34	76.47	1356	0.0251
1999	110	Barn Swallow	HIRU1	3	323	0.0093	34	8.82	1356	0.0251
1999	212	Barn Swallow	HIRU1	1	164	0.0061	34	2.94	1356	0.0251
1999	322	Barn Swallow	HIRU1	3	133	0.0226	34	8.82	1356	0.0251
1999	540	Barn Swallow	HIRU1	1	11	0.0909	34	2.94	1356	0.0251
1999	20	Northern Flicker	COAU1	1	87	0.0115	24	4.17	1356	0.0177
1999	110	Northern Flicker	COAU1	20	323	0.0619	24	83.33	1356	0.0177
1999	212	Northern Flicker	COAU1	1	164	0.0061	24	4.17	1356	0.0177
1999	230	Northern Flicker	COAU1	2	186	0.0108	24	8.33	1356	0.0177
1999	30	Red-winged Blackbird	AGPH1	15	125	0.1200	21	71.43	1356	0.0155
1999	110	Red-winged Blackbird	AGPH1	6	323	0.0186	21	28.57	1356	0.0155
1999	110	Rufous-sided Towhee	PIER1	2	323	0.0062	17	11.76	1356	0.0125
1999	230	Rufous-sided Towhee	PIER1	15	186	0.0806	17	88.24	1356	0.0125
1999	322	Rock Wren	SAOB1	5	133	0.0376	14	35.71	1356	0.0103
1999	323	Rock Wren	SAOB1	2	129	0.0155	14	14.29	1356	0.0103
1999	530	Rock Wren	SAOB1	3	1	3.0000	14	21.43	1356	0.0103
1999	540	Rock Wren	SAOB1	4	11	0.3636	14	28.57	1356	0.0103
1999	110	American Goldfinch	CATR1	6	323	0.0186	13	46.15	1356	0.0096
1999	230	American Goldfinch	CATR1	7	186	0.0376	13	53.85	1356	0.0096
1999	110	Black-capped Chickadee	PAAT1	1	323	0.0031	12	8.33	1356	0.0088
1999	230	Black-capped Chickadee	PAAT1	11	186	0.0591	12	91.67	1356	0.0088
1999	110	Chipping Sparrow	SPPA1	2	323	0.0062	10	20.00	1356	0.0074
1999	212	Chipping Sparrow	SPPA1	2	164	0.0122	10	20.00	1356	0.0074
1999	230	Chipping Sparrow	SPPA1	6	186	0.0323	10	60.00	1356	0.0074
1999	230	Mountain Bluebird	SICU1	6	186	0.0323	9	66.67	1356	0.0066
1999	323	Mountain Bluebird	SICU1	3	129	0.0233	9	33.33	1356	0.0066

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1999	30	White-crowned Sparrow	ZOLE1	4	125	0.0320	7	57.14	1356	0.0052
1999	110	American Robin	TUMI1	3	323	0.0093	7	42.86	1356	0.0052
1999	110	White-crowned Sparrow	ZOLE1	3	323	0.0093	7	42.86	1356	0.0052
1999	230	American Robin	TUMI1	4	186	0.0215	7	57.14	1356	0.0052
1999	20	Common Yellowthroat	GETR1	1	87	0.0115	4	25.00	1356	0.0029
1999	30	Common Yellowthroat	GETR1	1	125	0.0080	4	25.00	1356	0.0029
1999	110	Rock Dove	COLI1	4	323	0.0124	4	100.00	1356	0.0029
1999	110	Common Yellowthroat	GETR1	1	323	0.0031	4	25.00	1356	0.0029
1999	110	Say's Phoebe	SASA1	2	323	0.0062	4	50.00	1356	0.0029
1999	212	Common Yellowthroat	GETR1	1	164	0.0061	4	25.00	1356	0.0029
1999	212	Say's Phoebe	SASA1	1	164	0.0061	4	25.00	1356	0.0029
1999	230	Say's Phoebe	SASA1	1	186	0.0054	4	25.00	1356	0.0029
1999	30	Marsh Wren	CIPA1	3	125	0.0240	3	100.00	1356	0.0022
1999	20	Loggerhead Shrike	LALU1	1	87	0.0115	2	50.00	1356	0.0015
1999	30	Grasshopper Sparrow	AMSA1	1	125	0.0080	2	50.00	1356	0.0015
1999	30	Belted Kingfisher	CEAL1	1	125	0.0080	2	50.00	1356	0.0015
1999	110	Belted Kingfisher	CEAL1	1	323	0.0031	2	50.00	1356	0.0015
1999	110	Virginia's Warbler	VEVI1	2	323	0.0062	2	100.00	1356	0.0015
1999	212	Blue Grosbeak	GUCA1	2	164	0.0122	2	100.00	1356	0.0015
1999	230	Loggerhead Shrike	LALU1	1	186	0.0054	2	50.00	1356	0.0015
1999	323	Grasshopper Sparrow	AMSA1	1	129	0.0078	2	50.00	1356	0.0015
1999	10	Hairy Woodpecker	PIVI1	1	49	0.0204	1	100.00	1356	0.0007
1999	20	Dark-eyed Junco	JUHY1	1	87	0.0115	1	100.00	1356	0.0007
1999	110	Common Nighthawk	CHMI1	1	323	0.0031	1	100.00	1356	0.0007
1999	110	Blue Jay	CYCR1	1	323	0.0031	1	100.00	1356	0.0007
1999	110	Ash-throated Flycatcher	MYCI1	1	323	0.0031	1	100.00	1356	0.0007
1999	110	Blue-gray Gnatcatcher	POCA2	1	323	0.0031	1	100.00	1356	0.0007
1999	110	Eastern Phoebe	SAPH1	1	323	0.0031	1	100.00	1356	0.0007
1999	110	Western Kingbird	TYVE1	1	323	0.0031	1	100.00	1356	0.0007
1999	110	Wilson's Warbler	WIPU1	1	323	0.0031	1	100.00	1356	0.0007
1999	322	Sage Thrasher	ORMO1	1	133	0.0075	1	100.00	1356	0.0007
1999	323	Horned Lark	ERAL1	1	129	0.0078	1	100.00	1356	0.0007

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	10	House Finch	CAME2	2	50	0.0400	157	1.27	1210	0.1298
1998	20	House Finch	CAME2	1	88	0.0114	157	0.64	1210	0.1298
1998	30	House Finch	CAME2	3	90	0.0333	157	1.91	1210	0.1298
1998	110	House Finch	CAME2	51	310	0.1645	157	32.48	1210	0.1298
1998	211	House Finch	CAME2	1	35	0.0286	157	0.64	1210	0.1298
1998	212	House Finch	CAME2	19	93	0.2043	157	12.10	1210	0.1298
1998	230	House Finch	CAME2	15	164	0.0915	157	9.55	1210	0.1298
1998	322	House Finch	CAME2	17	90	0.1889	157	10.83	1210	0.1298
1998	323	House Finch	CAME2	6	138	0.0435	157	3.82	1210	0.1298
1998	324	House Finch	CAME2	42	29	1.4483	157	26.75	1210	0.1298
1998	10	Vesper Sparrow	POGR1	5	50	0.1000	147	3.40	1210	0.1215
1998	20	Vesper Sparrow	POGR1	6	88	0.0682	147	4.08	1210	0.1215
1998	30	Vesper Sparrow	POGR1	6	90	0.0667	147	4.08	1210	0.1215
1998	110	Vesper Sparrow	POGR1	21	310	0.0677	147	14.29	1210	0.1215
1998	211	Vesper Sparrow	POGR1	1	35	0.0286	147	0.68	1210	0.1215
1998	212	Vesper Sparrow	POGR1	7	93	0.0753	147	4.76	1210	0.1215
1998	230	Vesper Sparrow	POGR1	3	164	0.0183	147	2.04	1210	0.1215
1998	322	Vesper Sparrow	POGR1	7	90	0.0778	147	4.76	1210	0.1215
1998	323	Vesper Sparrow	POGR1	81	138	0.5870	147	55.10	1210	0.1215
1998	324	Vesper Sparrow	POGR1	10	29	0.3448	147	6.80	1210	0.1215
1998	30	White-crowned Sparrow	ZOLE1	2	90	0.0222	95	2.11	1210	0.0785
1998	110	White-crowned Sparrow	ZOLE1	28	310	0.0903	95	29.47	1210	0.0785
1998	211	White-crowned Sparrow	ZOLE1	2	35	0.0571	95	2.11	1210	0.0785
1998	212	White-crowned Sparrow	ZOLE1	35	93	0.3763	95	36.84	1210	0.0785
1998	230	White-crowned Sparrow	ZOLE1	26	164	0.1585	95	27.37	1210	0.0785
1998	323	White-crowned Sparrow	ZOLE1	2	138	0.0145	95	2.11	1210	0.0785
1998	10	Western Meadowlark	STNE1	8	50	0.1600	71	11.27	1210	0.0587
1998	30	Western Meadowlark	STNE1	1	90	0.0111	71	1.41	1210	0.0587
1998	110	Western Meadowlark	STNE1	11	310	0.0355	71	15.49	1210	0.0587
1998	212	Western Meadowlark	STNE1	2	93	0.0215	71	2.82	1210	0.0587
1998	230	Western Meadowlark	STNE1	7	164	0.0427	71	9.86	1210	0.0587
1998	322	Western Meadowlark	STNE1	19	90	0.2111	71	26.76	1210	0.0587
1998	323	Western Meadowlark	STNE1	22	138	0.1594	71	30.99	1210	0.0587
1998	324	Western Meadowlark	STNE1	1	29	0.0345	71	1.41	1210	0.0587
1998	110	American Robin	TUM11	24	310	0.0774	56	42.86	1210	0.0463
1998	230	American Robin	TUM11	32	164	0.1951	56	57.14	1210	0.0463

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	110	European Starling	STVU1	35	310	0.1129	55	63.64	1210	0.0455
1998	324	European Starling	STVU1	20	29	0.6897	55	36.36	1210	0.0455
1998	20	American Tree Sparrow	SPAR1	4	88	0.0455	52	7.69	1210	0.0430
1998	30	American Tree Sparrow	SPAR1	7	90	0.0778	52	13.46	1210	0.0430
1998	110	Pine Siskin	CAPI1	15	310	0.0484	52	28.85	1210	0.0430
1998	110	American Tree Sparrow	SPAR1	20	310	0.0645	52	38.46	1210	0.0430
1998	211	American Tree Sparrow	SPAR1	3	35	0.0857	52	5.77	1210	0.0430
1998	212	American Tree Sparrow	SPAR1	3	93	0.0323	52	5.77	1210	0.0430
1998	230	Pine Siskin	CAPI1	24	164	0.1463	52	46.15	1210	0.0430
1998	230	American Tree Sparrow	SPAR1	14	164	0.0854	52	26.92	1210	0.0430
1998	322	Pine Siskin	CAPI1	13	90	0.1444	52	25.00	1210	0.0430
1998	420	American Tree Sparrow	SPAR1	1	5	0.2000	52	1.92	1210	0.0430
1998	20	Black-billed Magpie	PIPI1	1	88	0.0114	36	2.78	1210	0.0298
1998	110	Black-billed Magpie	PIPI1	18	310	0.0581	36	50.00	1210	0.0298
1998	212	Black-billed Magpie	PIPI1	3	93	0.0323	36	8.33	1210	0.0298
1998	230	Black-billed Magpie	PIPI1	9	164	0.0549	36	25.00	1210	0.0298
1998	323	Black-billed Magpie	PIPI1	5	138	0.0362	36	13.89	1210	0.0298
1998	20	American Goldfinch	CATR1	1	88	0.0114	32	3.13	1210	0.0264
1998	30	American Goldfinch	CATR1	2	90	0.0222	32	6.25	1210	0.0264
1998	110	American Goldfinch	CATR1	13	310	0.0419	32	40.63	1210	0.0264
1998	211	American Goldfinch	CATR1	1	35	0.0286	32	3.13	1210	0.0264
1998	230	American Goldfinch	CATR1	15	164	0.0915	32	46.88	1210	0.0264
1998	30	Mourning Dove	ZEMA1	2	90	0.0222	29	6.90	1210	0.0240
1998	110	Mourning Dove	ZEMA1	22	310	0.0710	29	75.86	1210	0.0240
1998	230	Mourning Dove	ZEMA1	2	164	0.0122	29	6.90	1210	0.0240
1998	323	Mourning Dove	ZEMA1	3	138	0.0217	29	10.34	1210	0.0240
1998	10	Barn Swallow	HIRU1	1	50	0.0200	27	3.70	1210	0.0223
1998	10	Song Sparrow	MEME2	2	50	0.0400	27	7.41	1210	0.0223
1998	20	Barn Swallow	HIRU1	1	88	0.0114	27	3.70	1210	0.0223
1998	20	Song Sparrow	MEME2	2	88	0.0227	27	7.41	1210	0.0223
1998	30	Barn Swallow	HIRU1	8	90	0.0889	27	29.63	1210	0.0223
1998	30	Song Sparrow	MEME2	6	90	0.0667	27	22.22	1210	0.0223
1998	54	Barn Swallow	HIRU1	3	103	0.0291	27	11.11	1210	0.0223
1998	110	Barn Swallow	HIRU1	10	310	0.0323	27	37.04	1210	0.0223
1998	110	Song Sparrow	MEME2	9	310	0.0290	27	33.33	1210	0.0223
1998	211	Song Sparrow	MEME2	1	35	0.0286	27	3.70	1210	0.0223

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	230	Barn Swallow	HIRU1	2	164	0.0122	27	7.41	1210	0.0223
1998	230	Song Sparrow	MEME2	7	164	0.0427	27	25.93	1210	0.0223
1998	322	Barn Swallow	HIRU1	2	90	0.0222	27	7.41	1210	0.0223
1998	110	Black-capped Chickadee	PAAT1	12	310	0.0387	26	46.15	1210	0.0215
1998	212	Black-capped Chickadee	PAAT1	2	93	0.0215	26	7.69	1210	0.0215
1998	230	Black-capped Chickadee	PAAT1	12	164	0.0732	26	46.15	1210	0.0215
1998	323	Chestnut-collared longspur	CAOR1	24	138	0.1739	24	100.00	1210	0.0198
1998	30	Red-winged Blackbird	AGPH1	20	90	0.2222	23	86.96	1210	0.0190
1998	110	Red-winged Blackbird	AGPH1	2	310	0.0065	23	8.70	1210	0.0190
1998	212	Red-winged Blackbird	AGPH1	1	93	0.0108	23	4.35	1210	0.0190
1998	10	Northern Flicker	COAU1	1	50	0.0200	21	4.76	1210	0.0174
1998	110	Northern Flicker	COAU1	18	310	0.0581	21	85.71	1210	0.0174
1998	212	Northern Flicker	COAU1	1	93	0.0108	21	4.76	1210	0.0174
1998	230	Northern Flicker	COAU1	1	164	0.0061	21	4.76	1210	0.0174
1998	110	Rufous-sided Towhee	PIER1	2	310	0.0065	19	10.53	1210	0.0157
1998	230	Rufous-sided Towhee	PIER1	17	164	0.1037	19	89.47	1210	0.0157
1998	10	Grasshopper Sparrow	AMSA1	1	50	0.0200	16	6.25	1210	0.0132
1998	110	Grasshopper Sparrow	AMSA1	12	310	0.0387	16	75.00	1210	0.0132
1998	211	Grasshopper Sparrow	AMSA1	1	35	0.0286	16	6.25	1210	0.0132
1998	323	Grasshopper Sparrow	AMSA1	2	138	0.0145	16	12.50	1210	0.0132
1998	10	Common Yellowthroat	GETR1	1	50	0.0200	11	9.09	1210	0.0091
1998	20	Common Yellowthroat	GETR1	1	88	0.0114	11	9.09	1210	0.0091
1998	30	Common Yellowthroat	GETR1	3	90	0.0333	11	27.27	1210	0.0091
1998	110	Common Yellowthroat	GETR1	4	310	0.0129	11	36.36	1210	0.0091
1998	211	Common Yellowthroat	GETR1	1	35	0.0286	11	9.09	1210	0.0091
1998	212	Common Yellowthroat	GETR1	1	93	0.0108	11	9.09	1210	0.0091
1998	20	Blue Grosbeak	GUCA1	1	88	0.0114	10	10.00	1210	0.0083
1998	110	Blue Grosbeak	GUCA1	9	310	0.0290	10	90.00	1210	0.0083
1998	322	Horned Lark	ERAL1	2	90	0.0222	9	22.22	1210	0.0074
1998	323	Horned Lark	ERAL1	7	138	0.0507	9	77.78	1210	0.0074
1998	20	Say's Phoebe	SASA1	1	88	0.0114	7	14.29	1210	0.0058
1998	20	Chipping Sparrow	SPPA1	1	88	0.0114	7	14.29	1210	0.0058
1998	110	Say's Phoebe	SASA1	2	310	0.0065	7	28.57	1210	0.0058
1998	110	Chipping Sparrow	SPPA1	2	310	0.0065	7	28.57	1210	0.0058
1998	212	Say's Phoebe	SASA1	3	93	0.0323	7	42.86	1210	0.0058
1998	212	Chipping Sparrow	SPPA1	4	93	0.0430	7	57.14	1210	0.0058
1998	230	Say's Phoebe	SASA1	1	164	0.0061	7	14.29	1210	0.0058

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	110	Western Kingbird	TYVE1	4	310	0.0129	6	66.67	1210	0.0050
1998	322	Western Kingbird	TYVE1	2	90	0.0222	6	33.33	1210	0.0050
1998	10	Lark Sparrow	CHGR1	5	50	0.1000	5	100.00	1210	0.0041
1998	212	Brewer's Blackbird	EUCY1	5	93	0.0538	5	100.00	1210	0.0041
1998	10	House Wren	TRAE1	1	50	0.0200	3	33.33	1210	0.0025
1998	110	Downy Woodpecker	PIPU1	3	310	0.0097	3	100.00	1210	0.0025
1998	110	Eastern Phoebe	SAPH1	3	310	0.0097	3	100.00	1210	0.0025
1998	230	House Wren	TRAE1	2	164	0.0122	3	66.67	1210	0.0025
1998	20	Eastern Kingbird	TYTY1	1	88	0.0114	1	100.00	1210	0.0008
1998	54	Common Merganser	MEME1	1	103	0.0097	1	100.00	1210	0.0008
1998	110	Dark-eyed Junco	JUHY1	1	310	0.0032	1	100.00	1210	0.0008
1998	110	Northern mockingbird	MIPO1	1	310	0.0032	1	100.00	1210	0.0008
1998	230	Sage Thrasher	ORMO1	1	164	0.0061	1	100.00	1210	0.0008
1998	230	Green-tailed Towhee	PICH1	1	164	0.0061	1	100.00	1210	0.0008
1998	322	Common Raven	COCO1	1	90	0.0111	1	100.00	1210	0.0008
1997	10	Western Meadowlark	STNE1	12	63	0.1905	176	6.82	1221	0.1441
1997	20	Western Meadowlark	STNE1	9	95	0.0947	176	5.11	1221	0.1441
1997	30	Western Meadowlark	STNE1	8	62	0.1290	176	4.55	1221	0.1441
1997	93	Western Meadowlark	STNE1	14	18	0.7778	176	7.95	1221	0.1441
1997	110	Western Meadowlark	STNE1	44	313	0.1406	176	25.00	1221	0.1441
1997	211	Western Meadowlark	STNE1	4	55	0.0727	176	2.27	1221	0.1441
1997	212	Western Meadowlark	STNE1	28	86	0.3256	176	15.91	1221	0.1441
1997	230	Western Meadowlark	STNE1	14	182	0.0769	176	7.95	1221	0.1441
1997	322	Western Meadowlark	STNE1	12	62	0.1935	176	6.82	1221	0.1441
1997	323	Western Meadowlark	STNE1	17	161	0.1056	176	9.66	1221	0.1441
1997	324	Western Meadowlark	STNE1	12	16	0.7500	176	6.82	1221	0.1441
1997	530	Western Meadowlark	STNE1	2	2	1.0000	176	1.14	1221	0.1441
1997	20	House Finch	CAME2	2	95	0.0211	158	1.27	1221	0.1294
1997	54	House Finch	CAME2	5	82	0.0610	158	3.16	1221	0.1294
1997	110	House Finch	CAME2	66	313	0.2109	158	41.77	1221	0.1294
1997	211	House Finch	CAME2	5	55	0.0909	158	3.16	1221	0.1294
1997	212	House Finch	CAME2	25	86	0.2907	158	15.82	1221	0.1294
1997	230	House Finch	CAME2	35	182	0.1923	158	22.15	1221	0.1294
1997	322	House Finch	CAME2	4	62	0.0645	158	2.53	1221	0.1294
1997	324	House Finch	CAME2	1	16	0.0625	158	0.63	1221	0.1294
1997	540	House Finch	CAME2	15	21	0.7143	158	9.49	1221	0.1294

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	10	Black-billed Magpie	PIPI1	1	63	0.0159	84	1.19	1221	0.0688
1997	20	Black-billed Magpie	PIPI1	1	95	0.0105	84	1.19	1221	0.0688
1997	30	Black-billed Magpie	PIPI1	5	62	0.0806	84	5.95	1221	0.0688
1997	110	Black-billed Magpie	PIPI1	55	313	0.1757	84	65.48	1221	0.0688
1997	212	Black-billed Magpie	PIPI1	10	86	0.1163	84	11.90	1221	0.0688
1997	230	Black-billed Magpie	PIPI1	11	182	0.0604	84	13.10	1221	0.0688
1997	323	Black-billed Magpie	PIPI1	1	161	0.0062	84	1.19	1221	0.0688
1997	10	Vesper Sparrow	POGR1	18	63	0.2857	77	23.38	1221	0.0631
1997	20	Vesper Sparrow	POGR1	3	95	0.0316	77	3.90	1221	0.0631
1997	30	Vesper Sparrow	POGR1	3	62	0.0484	77	3.90	1221	0.0631
1997	54	Vesper Sparrow	POGR1	1	82	0.0122	77	1.30	1221	0.0631
1997	93	Vesper Sparrow	POGR1	1	18	0.0556	77	1.30	1221	0.0631
1997	110	Vesper Sparrow	POGR1	13	313	0.0415	77	16.88	1221	0.0631
1997	211	Vesper Sparrow	POGR1	3	55	0.0545	77	3.90	1221	0.0631
1997	212	Vesper Sparrow	POGR1	2	86	0.0233	77	2.60	1221	0.0631
1997	230	Vesper Sparrow	POGR1	15	182	0.0824	77	19.48	1221	0.0631
1997	322	Vesper Sparrow	POGR1	5	62	0.0806	77	6.49	1221	0.0631
1997	323	Vesper Sparrow	POGR1	13	161	0.0807	77	16.88	1221	0.0631
1997	10	Song Sparrow	MEME2	1	63	0.0159	70	1.43	1221	0.0573
1997	20	Song Sparrow	MEME2	9	95	0.0947	70	12.86	1221	0.0573
1997	30	Song Sparrow	MEME2	11	62	0.1774	70	15.71	1221	0.0573
1997	110	Song Sparrow	MEME2	24	313	0.0767	70	34.29	1221	0.0573
1997	211	Song Sparrow	MEME2	4	55	0.0727	70	5.71	1221	0.0573
1997	212	Song Sparrow	MEME2	8	86	0.0930	70	11.43	1221	0.0573
1997	230	Song Sparrow	MEME2	13	182	0.0714	70	18.57	1221	0.0573
1997	110	Rufous-sided Towhee	PIER1	4	313	0.0128	52	7.69	1221	0.0426
1997	212	Rufous-sided Towhee	PIER1	2	86	0.0233	52	3.85	1221	0.0426
1997	230	Rufous-sided Towhee	PIER1	46	182	0.2527	52	88.46	1221	0.0426
1997	20	American Tree Sparrow	SPAR1	3	95	0.0316	47	6.38	1221	0.0385
1997	30	American Tree Sparrow	SPAR1	1	62	0.0161	47	2.13	1221	0.0385
1997	110	American Tree Sparrow	SPAR1	34	313	0.1086	47	72.34	1221	0.0385
1997	230	American Tree Sparrow	SPAR1	5	182	0.0275	47	10.64	1221	0.0385
1997	322	American Tree Sparrow	SPAR1	4	62	0.0645	47	8.51	1221	0.0385
1997	110	European Starling	STVU1	41	313	0.1310	42	97.62	1221	0.0344
1997	230	European Starling	STVU1	1	182	0.0055	42	2.38	1221	0.0344

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	30	White-crowned Sparrow	ZOLE1	4	62	0.0645	30	13.33	1221	0.0246
1997	110	White-crowned Sparrow	ZOLE1	8	313	0.0256	30	26.67	1221	0.0246
1997	212	White-crowned Sparrow	ZOLE1	9	86	0.1047	30	30.00	1221	0.0246
1997	230	White-crowned Sparrow	ZOLE1	8	182	0.0440	30	26.67	1221	0.0246
1997	540	White-crowned Sparrow	ZOLE1	1	21	0.0476	30	3.33	1221	0.0246
1997	20	American Goldfinch	CATR1	6	95	0.0632	25	24.00	1221	0.0205
1997	110	American Goldfinch	CATR1	9	313	0.0288	25	36.00	1221	0.0205
1997	212	American Goldfinch	CATR1	3	86	0.0349	25	12.00	1221	0.0205
1997	230	American Goldfinch	CATR1	7	182	0.0385	25	28.00	1221	0.0205
1997	30	Red-winged Blackbird	AGPH1	4	62	0.0645	19	21.05	1221	0.0156
1997	93	Red-winged Blackbird	AGPH1	6	18	0.3333	19	31.58	1221	0.0156
1997	110	Red-winged Blackbird	AGPH1	1	313	0.0032	19	5.26	1221	0.0156
1997	110	Northern Flicker	COAU1	16	313	0.0511	19	84.21	1221	0.0156
1997	212	Red-winged Blackbird	AGPH1	7	86	0.0814	19	36.84	1221	0.0156
1997	212	Northern Flicker	COAU1	1	86	0.0116	19	5.26	1221	0.0156
1997	230	Red-winged Blackbird	AGPH1	1	182	0.0055	19	5.26	1221	0.0156
1997	230	Northern Flicker	COAU1	2	182	0.0110	19	10.53	1221	0.0156
1997	30	Chipping Sparrow	SPPA1	3	62	0.0484	13	23.08	1221	0.0106
1997	54	Cliff Swallow	HIPY1	4	82	0.0488	13	30.77	1221	0.0106
1997	110	Cliff Swallow	HIPY1	9	313	0.0288	13	69.23	1221	0.0106
1997	110	Chipping Sparrow	SPPA1	3	313	0.0096	13	23.08	1221	0.0106
1997	211	Chipping Sparrow	SPPA1	6	55	0.1091	13	46.15	1221	0.0106
1997	230	Chipping Sparrow	SPPA1	1	182	0.0055	13	7.69	1221	0.0106
1997	110	Black-capped Chickadee	PAAT1	4	313	0.0128	12	33.33	1221	0.0098
1997	230	Black-capped Chickadee	PAAT1	8	182	0.0440	12	66.67	1221	0.0098
1997	110	American Robin	TUMI1	4	313	0.0128	9	44.44	1221	0.0074
1997	212	American Robin	TUMI1	1	86	0.0116	9	11.11	1221	0.0074
1997	230	American Robin	TUMI1	2	182	0.0110	9	22.22	1221	0.0074
1997	322	American Robin	TUMI1	1	62	0.0161	9	11.11	1221	0.0074
1997	324	American Robin	TUMI1	1	16	0.0625	9	11.11	1221	0.0074
1997	10	Grasshopper Sparrow	AMSA1	2	63	0.0317	7	28.57	1221	0.0057
1997	20	Grasshopper Sparrow	AMSA1	1	95	0.0105	7	14.29	1221	0.0057
1997	93	Yellow-rumped Warbler	DECO1	1	18	0.0556	7	14.29	1221	0.0057
1997	110	Grasshopper Sparrow	AMSA1	1	313	0.0032	7	14.29	1221	0.0057
1997	110	Yellow-rumped Warbler	DECO1	6	313	0.0192	7	85.71	1221	0.0057
1997	211	Grasshopper Sparrow	AMSA1	1	55	0.0182	7	14.29	1221	0.0057
1997	323	Grasshopper Sparrow	AMSA1	2	161	0.0124	7	28.57	1221	0.0057

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	110	Horned Lark	ERAL1	2	313	0.0064	6	33.33	1221	0.0049
1997	230	Horned Lark	ERAL1	2	182	0.0110	6	33.33	1221	0.0049
1997	323	Horned Lark	ERAL1	2	161	0.0124	6	33.33	1221	0.0049
1997	110	House Wren	TRAE1	4	313	0.0128	5	80.00	1221	0.0041
1997	110	Mourning Dove	ZEMA1	3	313	0.0096	5	60.00	1221	0.0041
1997	212	Mourning Dove	ZEMA1	2	86	0.0233	5	40.00	1221	0.0041
1997	530	House Wren	TRAE1	1	2	0.5000	5	20.00	1221	0.0041
1997	110	Say's Phoebe	SASA1	1	313	0.0032	3	33.33	1221	0.0025
1997	212	Say's Phoebe	SASA1	1	86	0.0116	3	33.33	1221	0.0025
1997	322	Say's Phoebe	SASA1	1	62	0.0161	3	33.33	1221	0.0025
1997	110	Common Raven	COCO1	1	313	0.0032	2	50.00	1221	0.0016
1997	110	Western Kingbird	TYVE1	1	313	0.0032	2	50.00	1221	0.0016
1997	230	Common Raven	COCO1	1	182	0.0055	2	50.00	1221	0.0016
1997	230	Golden-crowned Kinglet	RESA1	2	182	0.0110	2	100.00	1221	0.0016
1997	230	Rock Wren	SAOB1	1	182	0.0055	2	50.00	1221	0.0016
1997	322	Western Kingbird	TYVE1	1	62	0.0161	2	50.00	1221	0.0016
1997	323	Rock Wren	SAOB1	1	161	0.0062	2	50.00	1221	0.0016
1997	110	Common Yellowthroat	GETR1	1	313	0.0032	1	100.00	1221	0.0008
1997	110	Dark-eyed Junco	JUHY1	1	313	0.0032	1	100.00	1221	0.0008
1997	110	Hairy Woodpecker	PIV11	1	313	0.0032	1	100.00	1221	0.0008
1997	212	Yellow Warbler	DEPE1	1	86	0.0116	1	100.00	1221	0.0008
1997	230	Green-tailed Towhee	PICH1	1	182	0.0055	1	100.00	1221	0.0008
1996	10	House Finch	CAME2	5	64	0.0781	252	1.98	1418	0.1777
1996	20	House Finch	CAME2	7	109	0.0642	252	2.78	1418	0.1777
1996	30	House Finch	CAME2	2	95	0.0211	252	0.79	1418	0.1777
1996	110	House Finch	CAME2	75	300	0.2500	252	29.76	1418	0.1777
1996	211	House Finch	CAME2	12	112	0.1071	252	4.76	1418	0.1777
1996	212	House Finch	CAME2	15	101	0.1485	252	5.95	1418	0.1777
1996	230	House Finch	CAME2	40	196	0.2041	252	15.87	1418	0.1777
1996	322	House Finch	CAME2	17	105	0.1619	252	6.75	1418	0.1777
1996	324	House Finch	CAME2	6	41	0.1463	252	2.38	1418	0.1777
1996	410	House Finch	CAME2	73	14	5.2143	252	28.97	1418	0.1777
1996	540	Lapland Longspur	CALA1	100	1	100.0000	100	100.00	1418	0.0705

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	10	Vesper Sparrow	POGR1	7	64	0.1094	71	9.86	1418	0.0501
1996	20	Vesper Sparrow	POGR1	2	109	0.0183	71	2.82	1418	0.0501
1996	110	Vesper Sparrow	POGR1	13	300	0.0433	71	18.31	1418	0.0501
1996	211	Vesper Sparrow	POGR1	2	112	0.0179	71	2.82	1418	0.0501
1996	212	Vesper Sparrow	POGR1	3	101	0.0297	71	4.23	1418	0.0501
1996	230	Vesper Sparrow	POGR1	4	196	0.0204	71	5.63	1418	0.0501
1996	322	Vesper Sparrow	POGR1	7	105	0.0667	71	9.86	1418	0.0501
1996	323	Vesper Sparrow	POGR1	31	148	0.2095	71	43.66	1418	0.0501
1996	324	Vesper Sparrow	POGR1	2	41	0.0488	71	2.82	1418	0.0501
1996	10	Western Meadowlark	STNE1	5	64	0.0781	64	7.81	1418	0.0451
1996	20	Western Meadowlark	STNE1	9	109	0.0826	64	14.06	1418	0.0451
1996	30	Western Meadowlark	STNE1	7	95	0.0737	64	10.94	1418	0.0451
1996	110	Western Meadowlark	STNE1	7	300	0.0233	64	10.94	1418	0.0451
1996	211	Western Meadowlark	STNE1	5	112	0.0446	64	7.81	1418	0.0451
1996	230	Western Meadowlark	STNE1	1	196	0.0051	64	1.56	1418	0.0451
1996	322	Western Meadowlark	STNE1	15	105	0.1429	64	23.44	1418	0.0451
1996	323	Western Meadowlark	STNE1	14	148	0.0946	64	21.88	1418	0.0451
1996	324	Western Meadowlark	STNE1	1	41	0.0244	64	1.56	1418	0.0451
1996	30	Black-capped Chickadee	PAAT1	2	95	0.0211	51	3.92	1418	0.0360
1996	110	Black-capped Chickadee	PAAT1	16	300	0.0533	51	31.37	1418	0.0360
1996	130	Black-capped Chickadee	PAAT1	4	6	0.6667	51	7.84	1418	0.0360
1996	230	Black-capped Chickadee	PAAT1	29	196	0.1480	51	56.86	1418	0.0360
1996	10	Black-billed Magpie	PIPI1	1	64	0.0156	50	2.00	1418	0.0353
1996	20	Black-billed Magpie	PIPI1	6	109	0.0550	50	12.00	1418	0.0353
1996	110	Black-billed Magpie	PIPI1	25	300	0.0833	50	50.00	1418	0.0353
1996	130	Black-billed Magpie	PIPI1	1	6	0.1667	50	2.00	1418	0.0353
1996	212	Black-billed Magpie	PIPI1	1	101	0.0099	50	2.00	1418	0.0353
1996	230	Black-billed Magpie	PIPI1	14	196	0.0714	50	28.00	1418	0.0353
1996	322	Black-billed Magpie	PIPI1	1	105	0.0095	50	2.00	1418	0.0353
1996	323	Black-billed Magpie	PIPI1	1	148	0.0068	50	2.00	1418	0.0353
1996	20	European Starling	STVU1	2	109	0.0183	41	4.88	1418	0.0289
1996	110	European Starling	STVU1	28	300	0.0933	41	68.29	1418	0.0289
1996	130	European Starling	STVU1	1	6	0.1667	41	2.44	1418	0.0289
1996	322	European Starling	STVU1	6	105	0.0571	41	14.63	1418	0.0289
1996	324	European Starling	STVU1	4	41	0.0976	41	9.76	1418	0.0289
1996	110	Pine Siskin	CAPI1	29	300	0.0967	40	72.50	1418	0.0282
1996	230	Pine Siskin	CAPI1	11	196	0.0561	40	27.50	1418	0.0282

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	10	Horned Lark	ERAL1	1	64	0.0156	39	2.56	1418	0.0275
1996	230	Horned Lark	ERAL1	1	196	0.0051	39	2.56	1418	0.0275
1996	322	Horned Lark	ERAL1	1	105	0.0095	39	2.56	1418	0.0275
1996	323	Horned Lark	ERAL1	36	148	0.2432	39	92.31	1418	0.0275
1996	10	Song Sparrow	MEME2	1	64	0.0156	37	2.70	1418	0.0261
1996	20	Song Sparrow	MEME2	3	109	0.0275	37	8.11	1418	0.0261
1996	30	Song Sparrow	MEME2	15	95	0.1579	37	40.54	1418	0.0261
1996	54	Song Sparrow	MEME2	1	103	0.0097	37	2.70	1418	0.0261
1996	110	Song Sparrow	MEME2	7	300	0.0233	37	18.92	1418	0.0261
1996	130	Song Sparrow	MEME2	1	6	0.1667	37	2.70	1418	0.0261
1996	212	Song Sparrow	MEME2	2	101	0.0198	37	5.41	1418	0.0261
1996	230	Song Sparrow	MEME2	7	196	0.0357	37	18.92	1418	0.0261
1996	30	Chipping Sparrow	SPPA1	1	95	0.0105	30	3.33	1418	0.0212
1996	110	Chipping Sparrow	SPPA1	5	300	0.0167	30	16.67	1418	0.0212
1996	212	Chipping Sparrow	SPPA1	1	101	0.0099	30	3.33	1418	0.0212
1996	230	Chipping Sparrow	SPPA1	22	196	0.1122	30	73.33	1418	0.0212
1996	324	Chipping Sparrow	SPPA1	1	41	0.0244	30	3.33	1418	0.0212
1996	230	American Robin	TUMI1	25	196	0.1276	25	100.00	1418	0.0176
1996	10	Barn Swallow	HIRU1	2	64	0.0313	21	9.52	1418	0.0148
1996	20	Barn Swallow	HIRU1	2	109	0.0183	21	9.52	1418	0.0148
1996	30	White-crowned Sparrow	ZOLE1	2	95	0.0211	21	9.52	1418	0.0148
1996	30	Barn Swallow	HIRU1	2	95	0.0211	21	9.52	1418	0.0148
1996	54	Barn Swallow	HIRU1	6	103	0.0583	21	28.57	1418	0.0148
1996	110	White-crowned Sparrow	ZOLE1	1	300	0.0033	21	4.76	1418	0.0148
1996	110	Northern Flicker	COAU1	15	300	0.0500	21	71.43	1418	0.0148
1996	211	Barn Swallow	HIRU1	2	112	0.0179	21	9.52	1418	0.0148
1996	211	Northern Flicker	COAU1	1	112	0.0089	21	4.76	1418	0.0148
1996	212	White-crowned Sparrow	ZOLE1	7	101	0.0693	21	33.33	1418	0.0148
1996	212	Rock Wren	SAOB1	2	101	0.0198	21	9.52	1418	0.0148
1996	212	Northern Flicker	COAU1	4	101	0.0396	21	19.05	1418	0.0148
1996	230	White-crowned Sparrow	ZOLE1	11	196	0.0561	21	52.38	1418	0.0148
1996	230	Rock Wren	SAOB1	5	196	0.0255	21	23.81	1418	0.0148
1996	322	Rock Wren	SAOB1	11	105	0.1048	21	52.38	1418	0.0148
1996	322	Northern Flicker	COAU1	1	105	0.0095	21	4.76	1418	0.0148
1996	324	Barn Swallow	HIRU1	7	41	0.1707	21	33.33	1418	0.0148
1996	520	Rock Wren	SAOB1	1	2	0.5000	21	4.76	1418	0.0148
1996	530	Rock Wren	SAOB1	2	3	0.6667	21	9.52	1418	0.0148

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	10	American Goldfinch	CATR1	2	64	0.0313	20	10.00	1418	0.0141
1996	30	American Goldfinch	CATR1	2	95	0.0211	20	10.00	1418	0.0141
1996	110	American Goldfinch	CATR1	8	300	0.0267	20	40.00	1418	0.0141
1996	212	American Goldfinch	CATR1	4	101	0.0396	20	20.00	1418	0.0141
1996	230	American Goldfinch	CATR1	3	196	0.0153	20	15.00	1418	0.0141
1996	324	American Goldfinch	CATR1	1	41	0.0244	20	5.00	1418	0.0141
1996	110	Rufous-sided Towhee	PIER1	1	300	0.0033	17	5.88	1418	0.0120
1996	230	Rufous-sided Towhee	PIER1	16	196	0.0816	17	94.12	1418	0.0120
1996	110	Sage Thrasher	ORMO1	3	300	0.0100	11	27.27	1418	0.0078
1996	230	Sage Thrasher	ORMO1	7	196	0.0357	11	63.64	1418	0.0078
1996	323	Sage Thrasher	ORMO1	1	148	0.0068	11	9.09	1418	0.0078
1996	20	Mountain Bluebird	SICU1	5	109	0.0459	10	50.00	1418	0.0071
1996	110	Mountain Bluebird	SICU1	5	300	0.0167	10	50.00	1418	0.0071
1996	20	American Tree Sparrow	SPAR1	3	109	0.0275	9	33.33	1418	0.0063
1996	110	Mourning Dove	ZEMA1	7	300	0.0233	9	77.78	1418	0.0063
1996	110	American Tree Sparrow	SPAR1	4	300	0.0133	9	44.44	1418	0.0063
1996	230	American Tree Sparrow	SPAR1	2	196	0.0102	9	22.22	1418	0.0063
1996	323	Mourning Dove	ZEMA1	2	148	0.0135	9	22.22	1418	0.0063
1996	20	Say's Phoebe	SASA1	1	109	0.0092	8	12.50	1418	0.0056
1996	110	Wilson's Warbler	WIPU1	7	300	0.0233	8	87.50	1418	0.0056
1996	211	Say's Phoebe	SASA1	1	112	0.0089	8	12.50	1418	0.0056
1996	230	Wilson's Warbler	WIPU1	1	196	0.0051	8	12.50	1418	0.0056
1996	230	Say's Phoebe	SASA1	1	196	0.0051	8	12.50	1418	0.0056
1996	230	Green-tailed Towhee	PICH1	5	196	0.0255	8	62.50	1418	0.0056
1996	322	Say's Phoebe	SASA1	1	105	0.0095	8	12.50	1418	0.0056
1996	323	Say's Phoebe	SASA1	1	148	0.0068	8	12.50	1418	0.0056
1996	324	Say's Phoebe	SASA1	1	41	0.0244	8	12.50	1418	0.0056
1996	520	Say's Phoebe	SASA1	2	2	1.0000	8	25.00	1418	0.0056
1996	10	Western Kingbird	TYVE1	1	64	0.0156	3	33.33	1418	0.0021
1996	110	Lesser Goldfinch	CAPS1	1	300	0.0033	3	33.33	1418	0.0021
1996	230	Lesser Goldfinch	CAPS1	2	196	0.0102	3	66.67	1418	0.0021
1996	322	Rock Dove	COLI1	3	105	0.0286	3	100.00	1418	0.0021
1996	324	Western Kingbird	TYVE1	2	41	0.0488	3	66.67	1418	0.0021
1996	10	House Wren	TRAE1	1	64	0.0156	2	50.00	1418	0.0014
1996	10	Lark Sparrow	CHGR1	2	64	0.0313	2	100.00	1418	0.0014
1996	30	Common Yellowthroat	GETR1	1	95	0.0105	2	50.00	1418	0.0014
1996	110	House Wren	TRAE1	1	300	0.0033	2	50.00	1418	0.0014

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	130	Common Yellowthroat	GETR1	1	6	0.1667	2	50.00	1418	0.0014
1996	212	Red-winged Blackbird	AGPH1	2	101	0.0198	2	100.00	1418	0.0014
1996	110	Hairy Woodpecker	PIV11	1	300	0.0033	1	100.00	1418	0.0007
1996	110	Northern Shrike	LAEX1	1	300	0.0033	1	100.00	1418	0.0007
1996	212	MacGillivray's Warbler	OPTO1	1	101	0.0099	1	100.00	1418	0.0007
1996	230	Northern Pocket Gopher	THTA1	1	196	0.0051	1	100.00	1418	0.0007
1996	230	Dark-eyed Junco	JUHY1	1	196	0.0051	1	100.00	1418	0.0007
1996	230	Common Raven	COCO1	1	196	0.0051	1	100.00	1418	0.0007
1996	323	Grasshopper Sparrow	AMSA1	1	148	0.0068	1	100.00	1418	0.0007
1995	10	American Tree Sparrow	SPAR1	2	44	0.0455	201	0.995025	1837	0.1094
1995	20	American Tree Sparrow	SPAR1	5	125	0.0400	201	2.487562	1837	0.1094
1995	30	American Tree Sparrow	SPAR1	8	84	0.0952	201	3.9801	1837	0.1094
1995	110	American Tree Sparrow	SPAR1	53	373	0.1421	201	26.36816	1837	0.1094
1995	211	American Tree Sparrow	SPAR1	54	102	0.5294	201	26.86567	1837	0.1094
1995	212	American Tree Sparrow	SPAR1	57	200	0.2850	201	28.35821	1837	0.1094
1995	230	American Tree Sparrow	SPAR1	19	220	0.0864	201	9.452736	1837	0.1094
1995	324	American Tree Sparrow	SPAR1	2	31	0.0645	201	0.995025	1837	0.1094
1995	530	American Tree Sparrow	SPAR1	1	131	0.0076	201	0.497512	1837	0.1094
1995	20	House Finch	CAME2	1	125	0.0080	158	0.632911	1837	0.0860
1995	30	House Finch	CAME2	2	84	0.0238	158	1.265823	1837	0.0860
1995	54	House Finch	CAME2	9	134	0.0672	158	5.696203	1837	0.0860
1995	93	House Finch	CAME2	5	12	0.4167	158	3.164557	1837	0.0860
1995	110	House Finch	CAME2	51	373	0.1367	158	32.27848	1837	0.0860
1995	210	House Finch	CAME2	2	11	0.1818	158	1.265823	1837	0.0860
1995	212	House Finch	CAME2	51	200	0.2550	158	32.27848	1837	0.0860
1995	230	House Finch	CAME2	25	220	0.1136	158	15.82278	1837	0.0860
1995	322	House Finch	CAME2	2	327	0.0061	158	1.265823	1837	0.0860
1995	324	House Finch	CAME2	2	31	0.0645	158	1.265823	1837	0.0860
1995	420	House Finch	CAME2	3	12	0.2500	158	1.898734	1837	0.0860
1995	510	House Finch	CAME2	5	1	5.0000	158	3.164557	1837	0.0860
1995	110	European Starling	STVU1	74	373	0.1984	124	59.67742	1837	0.0675
1995	230	European Starling	STVU1	36	220	0.1636	124	29.03226	1837	0.0675
1995	324	European Starling	STVU1	14	31	0.4516	124	11.29032	1837	0.0675

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	30	Black-billed Magpie	PIPI1	5	84	0.0595	102	4.901961	1837	0.0555
1995	93	Black-billed Magpie	PIPI1	2	12	0.1667	102	1.960784	1837	0.0555
1995	110	Black-billed Magpie	PIPI1	10	373	0.0268	102	9.803922	1837	0.0555
1995	211	Black-billed Magpie	PIPI1	1	102	0.0098	102	0.980392	1837	0.0555
1995	212	Black-billed Magpie	PIPI1	12	200	0.0600	102	11.76471	1837	0.0555
1995	230	Black-billed Magpie	PIPI1	48	220	0.2182	102	47.05882	1837	0.0555
1995	322	Black-billed Magpie	PIPI1	24	327	0.0734	102	23.52941	1837	0.0555
1995	10	Western Meadowlark	STNE1	1	44	0.0227	85	1.176471	1837	0.0463
1995	30	Western Meadowlark	STNE1	1	84	0.0119	85	1.176471	1837	0.0463
1995	93	Western Meadowlark	STNE1	1	12	0.0833	85	1.176471	1837	0.0463
1995	110	Western Meadowlark	STNE1	33	373	0.0885	85	38.82353	1837	0.0463
1995	212	Western Meadowlark	STNE1	4	200	0.0200	85	4.705882	1837	0.0463
1995	230	Western Meadowlark	STNE1	14	220	0.0636	85	16.47059	1837	0.0463
1995	322	Western Meadowlark	STNE1	19	327	0.0581	85	22.35294	1837	0.0463
1995	324	Western Meadowlark	STNE1	9	31	0.2903	85	10.58824	1837	0.0463
1995	420	Western Meadowlark	STNE1	1	12	0.0833	85	1.176471	1837	0.0463
1995	530	Western Meadowlark	STNE1	1	131	0.0076	85	1.176471	1837	0.0463
1995	540	Western Meadowlark	STNE1	1	2	0.5000	85	1.176471	1837	0.0463
1995	10	Song Sparrow	MEME2	1	44	0.0227	58	1.724138	1837	0.0316
1995	20	Song Sparrow	MEME2	1	125	0.0080	58	1.724138	1837	0.0316
1995	30	Song Sparrow	MEME2	11	84	0.1310	58	18.96552	1837	0.0316
1995	93	Song Sparrow	MEME2	1	12	0.0833	58	1.724138	1837	0.0316
1995	110	Song Sparrow	MEME2	16	373	0.0429	58	27.58621	1837	0.0316
1995	211	Song Sparrow	MEME2	2	102	0.0196	58	3.448276	1837	0.0316
1995	212	Song Sparrow	MEME2	10	200	0.0500	58	17.24138	1837	0.0316
1995	230	Song Sparrow	MEME2	15	220	0.0682	58	25.86207	1837	0.0316
1995	322	Song Sparrow	MEME2	1	327	0.0031	58	1.724138	1837	0.0316
1995	20	Vesper Sparrow	POGR1	2	125	0.0160	57	3.508772	1837	0.0310
1995	30	Vesper Sparrow	POGR1	3	84	0.0357	57	5.263158	1837	0.0310
1995	93	Vesper Sparrow	POGR1	1	12	0.0833	57	1.754386	1837	0.0310
1995	110	Vesper Sparrow	POGR1	6	373	0.0161	57	10.52632	1837	0.0310
1995	212	Vesper Sparrow	POGR1	5	200	0.0250	57	8.77193	1837	0.0310
1995	230	Vesper Sparrow	POGR1	9	220	0.0409	57	15.78947	1837	0.0310
1995	322	Vesper Sparrow	POGR1	28	327	0.0856	57	49.12281	1837	0.0310
1995	530	Vesper Sparrow	POGR1	3	131	0.0229	57	5.263158	1837	0.0310

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	54	Red-winged Blackbird	AGPH1	5	134	0.0373	48	10.41667	1837	0.0261
1995	110	Red-winged Blackbird	AGPH1	35	373	0.0938	48	72.91667	1837	0.0261
1995	212	Red-winged Blackbird	AGPH1	5	200	0.0250	48	10.41667	1837	0.0261
1995	230	Red-winged Blackbird	AGPH1	2	220	0.0091	48	4.166667	1837	0.0261
1995	324	Red-winged Blackbird	AGPH1	1	31	0.0323	48	2.083333	1837	0.0261
1995	0	Barn Swallow	HIRU1	5	1	5.0000	38	13.15789	1837	0.0207
1995	20	Barn Swallow	HIRU1	2	125	0.0160	38	5.263158	1837	0.0207
1995	54	Barn Swallow	HIRU1	2	134	0.0149	38	5.263158	1837	0.0207
1995	110	Barn Swallow	HIRU1	25	373	0.0670	38	65.78947	1837	0.0207
1995	212	Barn Swallow	HIRU1	2	200	0.0100	38	5.263158	1837	0.0207
1995	322	Barn Swallow	HIRU1	2	327	0.0061	38	5.263158	1837	0.0207
1995	10	Horned Lark	ERAL1	1	44	0.0227	35	2.857143	1837	0.0191
1995	20	Horned Lark	ERAL1	23	125	0.1840	35	65.71429	1837	0.0191
1995	30	Northern Flicker	COAU1	1	84	0.0119	35	2.857143	1837	0.0191
1995	30	Horned Lark	ERAL1	5	84	0.0595	35	14.28571	1837	0.0191
1995	93	Northern Flicker	COAU1	1	12	0.0833	35	2.857143	1837	0.0191
1995	110	Northern Flicker	COAU1	27	373	0.0724	35	77.14286	1837	0.0191
1995	212	Northern Flicker	COAU1	4	200	0.0200	35	11.42857	1837	0.0191
1995	230	Northern Flicker	COAU1	1	220	0.0045	35	2.857143	1837	0.0191
1995	322	Horned Lark	ERAL1	6	327	0.0183	35	17.14286	1837	0.0191
1995	324	Northern Flicker	COAU1	1	31	0.0323	35	2.857143	1837	0.0191
1995	322	Lapland Longspur	CALA1	3	327	0.0092	33	9.090909	1837	0.0180
1995	323	Lapland Longspur	CALA1	30	25	1.2000	33	90.90909	1837	0.0180
1995	10	White-crowned Sparrow	ZOLE1	2	44	0.0455	32	6.25	1837	0.0174
1995	110	White-crowned Sparrow	ZOLE1	8	373	0.0214	32	25	1837	0.0174
1995	212	White-crowned Sparrow	ZOLE1	2	200	0.0100	32	6.25	1837	0.0174
1995	230	White-crowned Sparrow	ZOLE1	20	220	0.0909	32	62.5	1837	0.0174
1995	54	Cliff Swallow	HIPY1	22	134	0.1642	26	84.61538	1837	0.0142
1995	110	Cliff Swallow	HIPY1	4	373	0.0107	26	15.38462	1837	0.0142
1995	110	Pine Siskin	CAPI1	15	373	0.0402	25	60	1837	0.0136
1995	212	Pine Siskin	CAPI1	1	200	0.0050	25	4	1837	0.0136
1995	230	Pine Siskin	CAPI1	4	220	0.0182	25	16	1837	0.0136
1995	230	Rufous-sided Towhee	PIER1	25	220	0.1136	25	100	1837	0.0136
1995	324	Pine Siskin	CAPI1	5	31	0.1613	25	20	1837	0.0136
1995	110	American Goldfinch	CATR1	21	373	0.0563	23	91.30435	1837	0.0125
1995	230	American Goldfinch	CATR1	2	220	0.0091	23	8.695652	1837	0.0125

Table 3-24. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	110	Mourning Dove	ZEMA1	12	373	0.0322	20	60	1837	0.0109
1995	212	Mourning Dove	ZEMA1	4	200	0.0200	20	20	1837	0.0109
1995	322	Mourning Dove	ZEMA1	3	327	0.0092	20	15	1837	0.0109
1995	530	Mourning Dove	ZEMA1	1	131	0.0076	20	5	1837	0.0109
1995	110	Black-capped Chickadee	PAAT1	4	373	0.0107	14	28.57143	1837	0.0076
1995	211	Black-capped Chickadee	PAAT1	2	102	0.0196	14	14.28571	1837	0.0076
1995	212	Black-capped Chickadee	PAAT1	1	200	0.0050	14	7.142857	1837	0.0076
1995	230	Black-capped Chickadee	PAAT1	7	220	0.0318	14	50	1837	0.0076
1995	322	Chestnut-collared longspur	CAOR1	7	327	0.0214	7	100	1837	0.0038
1995	54	Eastern Kingbird	TYTY1	2	134	0.0149	5	40	1837	0.0027
1995	110	Eastern Kingbird	TYTY1	2	373	0.0054	5	40	1837	0.0027
1995	212	Eastern Kingbird	TYTY1	1	200	0.0050	5	20	1837	0.0027
1995	20	Common Raven	COCO1	1	125	0.0080	3	33.33333	1837	0.0016
1995	20	Sage Thrasher	ORMO1	1	125	0.0080	3	33.33333	1837	0.0016
1995	20	House Wren	TRAE1	1	125	0.0080	3	33.33333	1837	0.0016
1995	110	Say's Phoebe	SASA1	2	373	0.0054	3	66.66667	1837	0.0016
1995	211	Common Raven	COCO1	2	102	0.0196	3	66.66667	1837	0.0016
1995	212	Say's Phoebe	SASA1	1	200	0.0050	3	33.33333	1837	0.0016
1995	230	House Wren	TRAE1	2	220	0.0091	3	66.66667	1837	0.0016
1995	322	Sage Thrasher	ORMO1	2	327	0.0061	3	66.66667	1837	0.0016
1995	110	Downy Woodpecker	PIPU1	2	373	0.0054	2	100	1837	0.0011
1995	110	Wilson's Warbler	WIPU1	2	373	0.0054	2	100	1837	0.0011
1995	230	Dark-eyed Junco	JUHY1	2	220	0.0091	2	100	1837	0.0011
1995	230	Mountain Bluebird	SICU1	1	220	0.0045	2	50	1837	0.0011
1995	322	Mountain Bluebird	SICU1	1	327	0.0031	2	50	1837	0.0011
1995	110	American Pipit	ANRU1	1	373	0.0027	1	100	1837	0.0005
1995	110	Blue-gray Gnatcatcher	POCA2	1	373	0.0027	1	100	1837	0.0005
1995	110	Eastern Phoebe	SAPH1	1	373	0.0027	1	100	1837	0.0005
1995	110	Chipping Sparrow	SPPA1	1	373	0.0027	1	100	1837	0.0005
1995	110	American Robin	TUMI1	1	373	0.0027	1	100	1837	0.0005
1995	211	Clay-colored Sparrow	SPPA2	1	102	0.0098	1	100	1837	0.0005
1995	212	Grasshopper Sparrow	AMSA1	1	200	0.0050	1	100	1837	0.0005
1995	230	Brewer's Sparrow	SPBR1	1	220	0.0045	1	100	1837	0.0005
1995	324	Brewer's Blackbird	EUCY1	1	31	0.0323	1	100	1837	0.0005

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-25. Migratory bird relative abundance in winter (1995-2000)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	20	American Tree Sparrow	SPAR1	5	75	0.0667	87	5.75	1081	0.0805
2000	30	American Tree Sparrow	SPAR1	7	101	0.0693	87	8.05	1081	0.0805
2000	110	American Tree Sparrow	SPAR1	38	311	0.1222	87	43.68	1081	0.0805
2000	212	American Tree Sparrow	SPAR1	3	68	0.0441	87	3.45	1081	0.0805
2000	230	American Tree Sparrow	SPAR1	19	134	0.1418	87	21.84	1081	0.0805
2000	540	American Tree Sparrow	SPAR1	15	9	1.6667	87	17.24	1081	0.0805
2000	20	Black-billed Magpie	PIPI1	7	75	0.0933	73	9.59	1081	0.0675
2000	30	Black-billed Magpie	PIPI1	1	101	0.0099	73	1.37	1081	0.0675
2000	110	Black-billed Magpie	PIPI1	25	311	0.0804	73	34.25	1081	0.0675
2000	212	Black-billed Magpie	PIPI1	6	68	0.0882	73	8.22	1081	0.0675
2000	230	Black-billed Magpie	PIPI1	33	134	0.2463	73	45.21	1081	0.0675
2000	322	Black-billed Magpie	PIPI1	1	157	0.0064	73	1.37	1081	0.0675
2000	10	European Starling	STVU1	2	20	0.1000	35	5.71	1081	0.0324
2000	20	European Starling	STVU1	2	75	0.0267	35	5.71	1081	0.0324
2000	110	European Starling	STVU1	13	311	0.0418	35	37.14	1081	0.0324
2000	230	European Starling	STVU1	17	134	0.1269	35	48.57	1081	0.0324
2000	322	European Starling	STVU1	1	157	0.0064	35	2.86	1081	0.0324
2000	110	Northern Flicker	COAU1	15	311	0.0482	17	88.24	1081	0.0157
2000	230	Northern Flicker	COAU1	2	134	0.0149	17	11.76	1081	0.0157
2000	30	Red-winged Blackbird	AGPH1	4	101	0.0396	9	44.44	1081	0.0083
2000	110	Red-winged Blackbird	AGPH1	4	311	0.0129	9	44.44	1081	0.0083
2000	323	Red-winged Blackbird	AGPH1	1	126	0.0079	9	11.11	1081	0.0083
2000	110	House Finch	CAME2	7	311	0.0225	8	87.50	1081	0.0074
2000	212	House Finch	CAME2	1	68	0.0147	8	12.50	1081	0.0074
2000	30	Western Meadowlark	STNE1	2	101	0.0198	6	33.33	1081	0.0056
2000	110	Western Meadowlark	STNE1	3	311	0.0096	6	50.00	1081	0.0056
2000	212	Western Meadowlark	STNE1	1	68	0.0147	6	16.67	1081	0.0056
2000	20	Chipping Sparrow	SPPA1	4	75	0.0533	5	80.00	1081	0.0046
2000	230	Common Raven	COCO1	5	134	0.0373	5	100.00	1081	0.0046
2000	230	Black-capped Chickadee	PAAT1	5	134	0.0373	5	100.00	1081	0.0046
2000	322	Chipping Sparrow	SPPA1	1	157	0.0064	5	20.00	1081	0.0046
2000	110	Song Sparrow	MEME2	1	311	0.0032	3	33.33	1081	0.0028
2000	110	Downy Woodpecker	PIPU1	1	311	0.0032	3	33.33	1081	0.0028
2000	211	Downy Woodpecker	PIPU1	1	26	0.0385	3	33.33	1081	0.0028
2000	212	Downy Woodpecker	PIPU1	1	68	0.0147	3	33.33	1081	0.0028
2000	230	Song Sparrow	MEME2	2	134	0.0149	3	66.67	1081	0.0028
2000	230	Loggerhead Shrike	LALU1	2	134	0.0149	2	100.00	1081	0.0019

Table 3-25. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
2000	323	Mountain Bluebird	SICU1	2	126	0.0159	2	100.00	1081	0.0019
2000	322	Clay-colored Sparrow	SPPA2	1	157	0.0064	1	100.00	1081	0.0009
1999	93	Black-billed Magpie	PIPI1	2	3	0.6667	85	2.35	1053	0.0807
1999	110	Black-billed Magpie	PIPI1	26	263	0.0989	85	30.59	1053	0.0807
1999	212	Black-billed Magpie	PIPI1	13	63	0.2063	85	15.29	1053	0.0807
1999	230	Black-billed Magpie	PIPI1	30	136	0.2206	85	35.29	1053	0.0807
1999	322	Black-billed Magpie	PIPI1	10	152	0.0658	85	11.76	1053	0.0807
1999	324	Black-billed Magpie	PIPI1	1	16	0.0625	85	1.18	1053	0.0807
1999	420	Black-billed Magpie	PIPI1	3	3	1.0000	85	3.53	1053	0.0807
1999	212	European Starling	STVU1	39	63	0.6190	42	92.86	1053	0.0399
1999	230	European Starling	STVU1	2	136	0.0147	42	4.76	1053	0.0399
1999	322	European Starling	STVU1	1	152	0.0066	42	2.38	1053	0.0399
1999	30	Red-winged Blackbird	AGPH1	2	73	0.0274	24	8.33	1053	0.0228
1999	110	Red-winged Blackbird	AGPH1	21	263	0.0798	24	87.50	1053	0.0228
1999	230	Red-winged Blackbird	AGPH1	1	136	0.0074	24	4.17	1053	0.0228
1999	30	American Tree Sparrow	SPAR1	1	73	0.0137	23	4.35	1053	0.0218
1999	110	American Tree Sparrow	SPAR1	3	263	0.0114	23	13.04	1053	0.0218
1999	212	American Tree Sparrow	SPAR1	6	63	0.0952	23	26.09	1053	0.0218
1999	230	Horned Lark	ERAL1	2	136	0.0147	23	8.70	1053	0.0218
1999	230	American Tree Sparrow	SPAR1	10	136	0.0735	23	43.48	1053	0.0218
1999	322	Horned Lark	ERAL1	7	152	0.0461	23	30.43	1053	0.0218
1999	323	Horned Lark	ERAL1	14	127	0.1102	23	60.87	1053	0.0218
1999	420	American Tree Sparrow	SPAR1	3	3	1.0000	23	13.04	1053	0.0218
1999	110	Northern Flicker	COAU1	15	263	0.0570	16	93.75	1053	0.0152
1999	230	Northern Flicker	COAU1	1	136	0.0074	16	6.25	1053	0.0152
1999	30	Song Sparrow	MEME2	2	73	0.0274	7	28.57	1053	0.0066
1999	110	Song Sparrow	MEME2	2	263	0.0076	7	28.57	1053	0.0066
1999	230	Song Sparrow	MEME2	3	136	0.0221	7	42.86	1053	0.0066
1999	322	Western Meadowlark	STNE1	3	152	0.0197	6	50.00	1053	0.0057
1999	323	Western Meadowlark	STNE1	3	127	0.0236	6	50.00	1053	0.0057
1999	110	Black-capped Chickadee	PAAT1	2	263	0.0076	5	40.00	1053	0.0047
1999	230	Black-capped Chickadee	PAAT1	3	136	0.0221	5	60.00	1053	0.0047
1999	110	House Finch	CAME2	3	263	0.0114	4	75.00	1053	0.0038
1999	324	House Finch	CAME2	1	16	0.0625	4	25.00	1053	0.0038
1999	230	American Goldfinch	CATR1	2	136	0.0147	2	100.00	1053	0.0019
1999	230	Downy Woodpecker	PIPU1	1	136	0.0074	1	100.00	1053	0.0009

Table 3-25. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	110	Black-billed Magpie	PIPI1	25	300	0.0833	69	36.23	1092	0.0632
1998	212	Black-billed Magpie	PIPI1	4	94	0.0426	69	5.80	1092	0.0632
1998	230	Black-billed Magpie	PIPI1	33	137	0.2409	69	47.83	1092	0.0632
1998	322	Black-billed Magpie	PIPI1	2	93	0.0215	69	2.90	1092	0.0632
1998	324	Black-billed Magpie	PIPI1	3	59	0.0508	69	4.35	1092	0.0632
1998	540	Black-billed Magpie	PIPI1	2	3	0.6667	69	2.90	1092	0.0632
1998	20	American Tree Sparrow	SPAR1	2	126	0.0159	53	3.77	1092	0.0485
1998	30	American Tree Sparrow	SPAR1	1	49	0.0204	53	1.89	1092	0.0485
1998	110	American Tree Sparrow	SPAR1	16	300	0.0533	53	30.19	1092	0.0485
1998	211	American Tree Sparrow	SPAR1	5	28	0.1786	53	9.43	1092	0.0485
1998	212	American Tree Sparrow	SPAR1	14	94	0.1489	53	26.42	1092	0.0485
1998	230	American Tree Sparrow	SPAR1	13	137	0.0949	53	24.53	1092	0.0485
1998	324	American Tree Sparrow	SPAR1	2	59	0.0339	53	3.77	1092	0.0485
1998	20	Northern Flicker	COAU1	1	126	0.0079	24	4.17	1092	0.0220
1998	30	Northern Flicker	COAU1	1	49	0.0204	24	4.17	1092	0.0220
1998	110	Northern Flicker	COAU1	17	300	0.0567	24	70.83	1092	0.0220
1998	212	Northern Flicker	COAU1	1	94	0.0106	24	4.17	1092	0.0220
1998	220	Northern Flicker	COAU1	2	2	1.0000	24	8.33	1092	0.0220
1998	230	Northern Flicker	COAU1	2	137	0.0146	24	8.33	1092	0.0220
1998	20	Red-winged Blackbird	AGPH1	19	126	0.1508	21	90.48	1092	0.0192
1998	30	Red-winged Blackbird	AGPH1	2	49	0.0408	21	9.52	1092	0.0192
1998	30	European Starling	STVU1	2	49	0.0408	17	11.76	1092	0.0156
1998	110	Black-capped Chickadee	PAAT1	5	300	0.0167	17	29.41	1092	0.0156
1998	110	European Starling	STVU1	15	300	0.0500	17	88.24	1092	0.0156
1998	212	Black-capped Chickadee	PAAT1	2	94	0.0213	17	11.76	1092	0.0156
1998	230	Black-capped Chickadee	PAAT1	10	137	0.0730	17	58.82	1092	0.0156
1998	30	Horned Lark	ERAL1	1	49	0.0204	12	8.33	1092	0.0110
1998	230	Horned Lark	ERAL1	2	137	0.0146	12	16.67	1092	0.0110
1998	323	Horned Lark	ERAL1	1	114	0.0088	12	8.33	1092	0.0110
1998	324	Horned Lark	ERAL1	8	59	0.1356	12	66.67	1092	0.0110
1998	20	Song Sparrow	MEME2	2	126	0.0159	8	25.00	1092	0.0073
1998	30	Song Sparrow	MEME2	1	49	0.0204	8	12.50	1092	0.0073
1998	110	House Finch	CAME2	6	300	0.0200	8	75.00	1092	0.0073
1998	110	Song Sparrow	MEME2	1	300	0.0033	8	12.50	1092	0.0073
1998	212	Song Sparrow	MEME2	1	94	0.0106	8	12.50	1092	0.0073
1998	230	Song Sparrow	MEME2	3	137	0.0219	8	37.50	1092	0.0073
1998	324	House Finch	CAME2	2	59	0.0339	8	25.00	1092	0.0073

Table 3-25. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1998	110	Common Raven	COCO1	2	300	0.0067	4	50.00	1092	0.0037
1998	230	Western Meadowlark	STNE1	1	137	0.0073	4	25.00	1092	0.0037
1998	322	Common Raven	COCO1	2	93	0.0215	4	50.00	1092	0.0037
1998	322	Western Meadowlark	STNE1	3	93	0.0323	4	75.00	1092	0.0037
1998	110	American Robin	TUMI1	1	300	0.0033	2	50.00	1092	0.0018
1998	322	American Robin	TUMI1	1	93	0.0108	2	50.00	1092	0.0018
1998	30	Northern Shrike	LAEX1	1	49	0.0204	1	100.00	1092	0.0009
1998	110	Downy Woodpecker	PIPU1	1	300	0.0033	1	100.00	1092	0.0009
1997	10	European Starling	STVU1	1	33	0.0303	153	0.65	1112	0.1376
1997	110	European Starling	STVU1	51	310	0.1645	153	33.33	1112	0.1376
1997	212	European Starling	STVU1	97	73	1.3288	153	63.40	1112	0.1376
1997	230	European Starling	STVU1	3	156	0.0192	153	1.96	1112	0.1376
1997	322	European Starling	STVU1	1	86	0.0116	153	0.65	1112	0.1376
1997	10	American Tree Sparrow	SPAR1	1	33	0.0303	55	1.82	1112	0.0495
1997	20	American Tree Sparrow	SPAR1	2	127	0.0157	55	3.64	1112	0.0495
1997	110	American Tree Sparrow	SPAR1	43	310	0.1387	55	78.18	1112	0.0495
1997	212	American Tree Sparrow	SPAR1	2	73	0.0274	55	3.64	1112	0.0495
1997	230	American Tree Sparrow	SPAR1	5	156	0.0321	55	9.09	1112	0.0495
1997	540	American Tree Sparrow	SPAR1	2	6	0.3333	55	3.64	1112	0.0495
1997	20	Black-billed Magpie	PIPI1	3	127	0.0236	44	6.82	1112	0.0396
1997	30	Black-billed Magpie	PIPI1	1	48	0.0208	44	2.27	1112	0.0396
1997	110	Black-billed Magpie	PIPI1	21	310	0.0677	44	47.73	1112	0.0396
1997	110	American Robin	TUMI1	1	310	0.0032	44	2.27	1112	0.0396
1997	212	Black-billed Magpie	PIPI1	1	73	0.0137	44	2.27	1112	0.0396
1997	230	Black-billed Magpie	PIPI1	18	156	0.1154	44	40.91	1112	0.0396
1997	230	American Robin	TUMI1	39	156	0.2500	44	88.64	1112	0.0396
1997	322	American Robin	TUMI1	4	86	0.0465	44	9.09	1112	0.0396
1997	110	Black-capped Chickadee	PAAT1	28	310	0.0903	33	84.85	1112	0.0297
1997	230	Black-capped Chickadee	PAAT1	5	156	0.0321	33	15.15	1112	0.0297
1997	20	Horned Lark	ERAL1	1	127	0.0079	28	3.57	1112	0.0252
1997	110	Horned Lark	ERAL1	2	310	0.0065	28	7.14	1112	0.0252
1997	212	Horned Lark	ERAL1	2	73	0.0274	28	7.14	1112	0.0252
1997	322	Horned Lark	ERAL1	3	86	0.0349	28	10.71	1112	0.0252
1997	323	Horned Lark	ERAL1	20	149	0.1342	28	71.43	1112	0.0252
1997	20	Northern Flicker	COAU1	1	127	0.0079	20	5.00	1112	0.0180
1997	110	Northern Flicker	COAU1	16	310	0.0516	20	80.00	1112	0.0180

Table 3-25. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1997	212	Northern Flicker	COAU1	1	73	0.0137	20	5.00	1112	0.0180
1997	230	Northern Flicker	COAU1	2	156	0.0128	20	10.00	1112	0.0180
1997	10	Song Sparrow	MEME2	1	33	0.0303	8	12.50	1112	0.0072
1997	30	Song Sparrow	MEME2	1	48	0.0208	8	12.50	1112	0.0072
1997	110	Song Sparrow	MEME2	3	310	0.0097	8	37.50	1112	0.0072
1997	212	Song Sparrow	MEME2	1	73	0.0137	8	12.50	1112	0.0072
1997	230	Song Sparrow	MEME2	2	156	0.0128	8	25.00	1112	0.0072
1997	20	Common Raven	COCO1	2	127	0.0157	7	28.57	1112	0.0063
1997	110	Common Raven	COCO1	4	310	0.0129	7	57.14	1112	0.0063
1997	230	Common Raven	COCO1	1	156	0.0064	7	14.29	1112	0.0063
1997	20	Western Meadowlark	STNE1	1	127	0.0079	3	33.33	1112	0.0027
1997	211	Western Meadowlark	STNE1	2	39	0.0513	3	66.67	1112	0.0027
1997	323	Snow bunting	PLNI1	2	149	0.0134	2	100.00	1112	0.0018
1997	30	Red-winged Blackbird	AGPH1	1	48	0.0208	1	100.00	1112	0.0009
1997	110	House Finch	CAME2	1	310	0.0032	1	100.00	1112	0.0009
1997	110	Downy Woodpecker	PIPU1	1	310	0.0032	1	100.00	1112	0.0009
1996	20	American Tree Sparrow	SPAR1	1	85	0.0118	97	1.03	1243	0.0780
1996	110	American Tree Sparrow	SPAR1	16	275	0.0582	97	16.49	1243	0.0780
1996	212	American Tree Sparrow	SPAR1	10	148	0.0676	97	10.31	1243	0.0780
1996	230	American Tree Sparrow	SPAR1	16	144	0.1111	97	16.49	1243	0.0780
1996	322	American Tree Sparrow	SPAR1	1	111	0.0090	97	1.03	1243	0.0780
1996	323	American Tree Sparrow	SPAR1	53	244	0.2172	97	54.64	1243	0.0780
1996	20	Black-billed Magpie	PIPI1	5	85	0.0588	82	6.10	1243	0.0660
1996	30	Black-billed Magpie	PIPI1	1	81	0.0123	82	1.22	1243	0.0660
1996	110	Black-billed Magpie	PIPI1	40	275	0.1455	82	48.78	1243	0.0660
1996	212	Black-billed Magpie	PIPI1	5	148	0.0338	82	6.10	1243	0.0660
1996	230	Black-billed Magpie	PIPI1	27	144	0.1875	82	32.93	1243	0.0660
1996	322	Black-billed Magpie	PIPI1	1	111	0.0090	82	1.22	1243	0.0660
1996	323	Black-billed Magpie	PIPI1	2	244	0.0082	82	2.44	1243	0.0660
1996	324	Black-billed Magpie	PIPI1	1	21	0.0476	82	1.22	1243	0.0660
1996	10	Horned Lark	ERAL1	2	39	0.0513	14	14.29	1243	0.0113
1996	110	Northern Flicker	COAU1	8	275	0.0291	14	57.14	1243	0.0113
1996	110	Horned Lark	ERAL1	3	275	0.0109	14	21.43	1243	0.0113
1996	130	Northern Flicker	COAU1	1	1	1.0000	14	7.14	1243	0.0113
1996	212	Northern Flicker	COAU1	1	148	0.0068	14	7.14	1243	0.0113
1996	212	Horned Lark	ERAL1	4	148	0.0270	14	28.57	1243	0.0113

Table 3-25. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1996	230	Northern Flicker	COAU1	4	144	0.0278	14	28.57	1243	0.0113
1996	322	Horned Lark	ERAL1	3	111	0.0270	14	21.43	1243	0.0113
1996	323	Horned Lark	ERAL1	2	244	0.0082	14	14.29	1243	0.0113
1996	110	European Starling	STVU1	12	275	0.0436	12	100.00	1243	0.0097
1996	110	Black-capped Chickadee	PAAT1	2	275	0.0073	11	18.18	1243	0.0088
1996	230	Black-capped Chickadee	PAAT1	9	144	0.0625	11	81.82	1243	0.0088
1996	110	Song Sparrow	MEME2	2	275	0.0073	8	25.00	1243	0.0064
1996	212	Song Sparrow	MEME2	1	148	0.0068	8	12.50	1243	0.0064
1996	230	Song Sparrow	MEME2	5	144	0.0347	8	62.50	1243	0.0064
1996	110	Western Meadowlark	STNE1	3	275	0.0109	4	75.00	1243	0.0032
1996	323	Western Meadowlark	STNE1	1	244	0.0041	4	25.00	1243	0.0032
1996	10	Common Raven	COCO1	1	39	0.0256	3	33.33	1243	0.0024
1996	20	Common Raven	COCO1	1	85	0.0118	3	33.33	1243	0.0024
1996	54	Common Goldeneye	BUCL1	3	42	0.0714	3	100.00	1243	0.0024
1996	230	American Goldfinch	CATR1	3	144	0.0208	3	100.00	1243	0.0024
1996	230	Common Raven	COCO1	1	144	0.0069	3	33.33	1243	0.0024
1996	110	American Crow	COBR1	2	275	0.0073	2	100.00	1243	0.0016
1996	110	Loggerhead Shrike	LALU1	2	275	0.0073	2	100.00	1243	0.0016
1996	110	Red-winged Blackbird	AGPH1	1	275	0.0036	1	100.00	1243	0.0008
1996	110	Pine Siskin	CAPI1	1	275	0.0036	1	100.00	1243	0.0008
1996	110	Northern Shrike	LAEX1	1	275	0.0036	1	100.00	1243	0.0008
1996	110	Downy Woodpecker	PIPU1	1	275	0.0036	1	100.00	1243	0.0008
1996	110	Hairy Woodpecker	PIVI1	1	275	0.0036	1	100.00	1243	0.0008
1996	230	Dark-eyed Junco	JUHY1	1	144	0.0069	1	100.00	1243	0.0008
1996	323	Lapland Longspur	CALA1	1	244	0.0041	1	100.00	1243	0.0008
1995	10	Black-billed Magpie	PIPI1	1	72	0.0139	86	1.162791	1496	0.0575
1995	30	Black-billed Magpie	PIPI1	3	124	0.0242	86	3.488372	1496	0.0575
1995	93	Black-billed Magpie	PIPI1	2	5	0.4000	86	2.325581	1496	0.0575
1995	110	Black-billed Magpie	PIPI1	20	333	0.0601	86	23.25581	1496	0.0575
1995	120	Black-billed Magpie	PIPI1	1	5	0.2000	86	1.162791	1496	0.0575
1995	212	Black-billed Magpie	PIPI1	25	162	0.1543	86	29.06977	1496	0.0575
1995	230	Black-billed Magpie	PIPI1	24	156	0.1538	86	27.90698	1496	0.0575
1995	322	Black-billed Magpie	PIPI1	3	209	0.0144	86	3.488372	1496	0.0575
1995	323	Black-billed Magpie	PIPI1	7	95	0.0737	86	8.139535	1496	0.0575
1995	110	American Tree Sparrow	SPAR1	40	333	0.1201	74	54.05405	1496	0.0495
1995	211	American Tree Sparrow	SPAR1	6	71	0.0845	74	8.108108	1496	0.0495

Table 3-25. (cont.)

Year	Hab 1	Common Name	Species Code	Total Obs	Time HSY	Obs Min	Tot Obs Y	RA in Hab	Time SY	Obs Min Season
1995	212	American Tree Sparrow	SPAR1	15	162	0.0926	74	20.27027	1496	0.0495
1995	230	American Tree Sparrow	SPAR1	13	156	0.0833	74	17.56757	1496	0.0495
1995	30	Red-winged Blackbird	AGPH1	7	124	0.0565	31	22.58065	1496	0.0207
1995	30	House Finch	CAME2	1	124	0.0081	31	3.225806	1496	0.0207
1995	110	Red-winged Blackbird	AGPH1	7	333	0.0210	31	22.58065	1496	0.0207
1995	110	House Finch	CAME2	22	333	0.0661	31	70.96774	1496	0.0207
1995	120	House Finch	CAME2	2	5	0.4000	31	6.451613	1496	0.0207
1995	212	Red-winged Blackbird	AGPH1	17	162	0.1049	31	54.83871	1496	0.0207
1995	230	House Finch	CAME2	6	156	0.0385	31	19.35484	1496	0.0207
1995	110	Northern Flicker	COAU1	8	333	0.0240	19	42.10526	1496	0.0127
1995	110	Black-capped Chickadee	PAAT1	6	333	0.0180	19	31.57895	1496	0.0127
1995	211	Black-capped Chickadee	PAAT1	3	71	0.0423	19	15.78947	1496	0.0127
1995	212	Northern Flicker	COAU1	3	162	0.0185	19	15.78947	1496	0.0127
1995	230	Northern Flicker	COAU1	3	156	0.0192	19	15.78947	1496	0.0127
1995	230	Black-capped Chickadee	PAAT1	10	156	0.0641	19	52.63158	1496	0.0127
1995	322	Northern Flicker	COAU1	5	209	0.0239	19	26.31579	1496	0.0127
1995	110	American Goldfinch	CATR1	12	333	0.0360	12	100	1496	0.0080
1995	110	European Starling	STVU1	8	333	0.0240	10	80	1496	0.0067
1995	324	European Starling	STVU1	2	28	0.0714	10	20	1496	0.0067
1995	10	Song Sparrow	MEME2	1	72	0.0139	8	12.5	1496	0.0053
1995	30	Song Sparrow	MEME2	2	124	0.0161	8	25	1496	0.0053
1995	110	Song Sparrow	MEME2	3	333	0.0090	8	37.5	1496	0.0053
1995	211	Song Sparrow	MEME2	1	71	0.0141	8	12.5	1496	0.0053
1995	212	Song Sparrow	MEME2	1	162	0.0062	8	12.5	1496	0.0053
1995	10	Western Meadowlark	STNE1	1	72	0.0139	6	16.66667	1496	0.0040
1995	110	Western Meadowlark	STNE1	3	333	0.0090	6	50	1496	0.0040
1995	322	Western Meadowlark	STNE1	2	209	0.0096	6	33.33333	1496	0.0040
1995	110	Vesper Sparrow	POGR1	5	333	0.0150	5	100	1496	0.0033
1995	322	Horned Lark	ERAL1	5	209	0.0239	5	100	1496	0.0033
1995	110	Hairy Woodpecker	PIV11	2	333	0.0060	2	100	1496	0.0013
1995	230	Mountain Bluebird	SICU1	2	156	0.0128	2	100	1496	0.0013
1995	30	House Wren	TRAE1	1	124	0.0081	1	100	1496	0.0007
1995	110	Downy Woodpecker	PIPU1	1	333	0.0030	1	100	1496	0.0007
1995	230	Dark-eyed Junco	JUHY1	1	156	0.0064	1	100	1496	0.0007
1995	322	Common Raven	COCO1	1	209	0.0048	1	100	1496	0.0007

Note: HSY = habitat/season/year; RA = relative abundance in observations/minute; Time SY = observation time/season

Table 3-26. Jaccard index of June bird species composition, expressed as percent similarity, comparing the three major habitat types from 1994–2000

	1994			1995			1996			1997			1998			1999			2000			
	Grassland	Wetland	Woodland	Grassland	Wetland	Woodland	Grassland	Wetland	Woodland	Grassland	Wetland	Woodland	Grassland	Wetland	Woodland	Grassland	Wetland	Woodland	Grassland	Wetland	Woodland	
1994 Grassland																						Grassland 1994
Wetland	63%																					Wetland 1994
Woodland	60%	57%																				Woodland 1994
1995 Grassland	73%	66%	59%																			Grassland 1995
Wetland	61%	57%	55%	60%																		Wetland 1995
Woodland	57%	51%	72%	56%	52%																	Woodland 1995
1996 Grassland	56%	55%	45%	71%	57%	43%																Grassland 1996
Wetland	52%	44%	45%	54%	58%	43%	56%															Wetland 1996
Woodland	54%	56%	67%	52%	51%	68%	50%	44%														Woodland 1996
1997 Grassland	68%	53%	49%	72%	58%	46%	66%	57%	48%													Grassland 1997
Wetland	49%	51%	42%	50%	58%	40%	47%	62%	38%	49%												Wetland 1997
Woodland	55%	54%	68%	50%	46%	67%	37%	36%	61%	43%	38%											Woodland 1997
1998 Grassland	63%	60%	48%	67%	57%	43%	56%	51%	41%	53%	47%	45%										Grassland 1998
Wetland	60%	51%	48%	62%	62%	46%	65%	61%	53%	66%	56%	37%	47%									Wetland 1998
Woodland	56%	52%	69%	54%	50%	64%	40%	43%	65%	47%	37%	66%	49%	43%								Woodland 1998
1999 Grassland	65%	49%	46%	64%	54%	44%	62%	49%	45%	63%	44%	43%	62%	53%	47%							Grassland 1999
Wetland	54%	57%	49%	56%	59%	43%	49%	58%	45%	54%	59%	49%	53%	53%	47%	50%						Wetland 1999
Woodland	47%	45%	59%	42%	43%	58%	37%	32%	64%	36%	31%	65%	42%	37%	63%	40%	40%					Woodland 1999
2000 Grassland	62%	54%	50%	69%	65%	47%	63%	50%	49%	60%	46%	47%	63%	54%	54%	70%	56%	42%				Grassland 2000
Wetland	44%	50%	44%	41%	57%	36%	46%	55%	46%	47%	50%	43%	46%	55%	44%	47%	57%	40%	44%			Wetland 2000
Woodland	53%	49%	60%	45%	50%	57%	37%	37%	65%	41%	33%	64%	49%	43%	67%	50%	44%	76%	54%	44%		Woodland 2000

Table 3-26. Jaccard index of June bird species composition, expressed as percent similarity, comparing the three major habitat types from 1994–2000

Table 3-27. Simpson's diversity index for seasonal bird communities in the three major habitat types from 1994–2000

a Spring		1994	1995	1996	1997	1998	1999	2000
Grassland		0.83	0.79	0.76	0.79	0.71	0.72	0.71
Wetland		0.77	0.77	0.82	0.84	0.71	0.77	0.71
Woody		0.91	0.93	0.94	0.94	0.93	0.94	0.94
b June		1994	1995	1996	1997	1998	1999	2000
Grassland		0.88	0.86	0.84	0.83	0.82	0.80	0.84
Wetland		0.68	0.67	0.65	0.64	0.66	0.67	0.52
Woody		0.94	0.94	0.93	0.93	0.93	0.94	0.94
c Autumn		1994	1995	1996	1997	1998	1999	2000
Grassland		0.73	0.87	0.78	0.76	0.87	0.85	0.78
Wetland		0.92	0.68	0.91	0.89	0.90	0.89	0.89
Woody		0.95	0.92	0.95	0.92	0.93	0.93	0.91
d Winter		1994	1995	1996	1997	1998	1999	2000
Grassland		0.82	0.82	0.42	0.57	0.60	0.87	0.80
Wetland		0.61	0.64	0.81	0.67	0.91	0.86	0.87
Woody		0.87	0.86	0.83	0.76	0.88	0.78	0.82

Note: Calculation formula is $1 - \text{Sum}((n*(n-1))/(N*(N-1)))$ (TWS 1980)

Appendix A

Data Entry Codes for Significant Species Data

DATA ENTRY CODES FOR SIGNIFICANT SPECIES DATA

The following codes are used for data entry on data sheets for Multi-Species Census Surveys, which are subsequently entered into the Relative Abundance Database (RAD), and data sheets for Sitewide Significant Species Surveys, which are subsequently entered into the Sitewide Survey Database (SSD). These codes are also used for fortuitous observations. These codes are standardized throughout the Sitewide Ecology Database, and must be used for uniformity. Should a new species be identified, the first two letters of the genus name, the first two letters of the species name, and the number 1 will comprise the five-character alphanumeric species code for the new species. Where an identical code for the species already exists, the number 2, 3, or 4 will be assigned, instead of 1, to duplicates within each taxonomic group. Duplicates among taxonomic groups do exist in the database, and these are distinguished from each other by assignment of the taxonomic group code.

Observer

Enter initials of the primary observer (up to 3 letters).

Date of Observation

Input observation date as mm/dd/yy (e.g., 02/04/98).

Time of Observation

Enter observation time using 24-hour military time clock (e.g., 1310 for 1:10 PM).

Type of Observation (Obs. type)

Observation Codes:

1	= Visual (includes dead individuals)	6	= Scat/Pellets
2	= Trap/Net Capture	7	= Hair/Feathers/Other Remains
3	= Hand Capture	8	= Sound/Vocalization
4	= Radio Fix	9	= Photographic Evidence
5	= Tracks	10	= Nest/Eggs

Taxonomic Group Code (Taxn Grup)

Groups to be recorded include big game mammals; furbearers; small game mammals; upland game birds; waterfowl, shorebirds, and wading birds; raptors; reptiles, and amphibians; and threatened, endangered, and candidate species.

Taxonomic Group Codes:

B	= Big Game	R	= Raptors
C	= Carnivores	U	= Upland Game Birds
Y	= Lagomorphs (Rabbits and Hares), Large Rodents (Muskrats, Prairie Dogs), Bats	W	= Waterbirds (Waterfowl, Shorebirds, Wading Birds)
H	= Herpetiles (Reptiles/Amphibians)	L	= Lepidoptera
F	= Fish		
S	= Songbirds (Passerines and non-waterfowl, non-raptor species)		

Species Code

Enter species code from Current Approved Species Code (see Attachment A). Note that any species of the listed taxonomic groups that is not specifically listed in Attachment A may be new to the Site, and will require assignment of a new species code.

Observation Area (Admin Area)

Enter code for observation area relative to Rocky Flats:

Administrative Area Codes:

PA	=	Protected Area
IA	=	Industrial Area
BZ	=	Buffer Zone
EA	=	Extended Observation Area*

*Within 10 km of Rocky Flats boundary.

Name of Observation Location (Site Name)

Enter name of transect.

Name of Operable Unit (OU)

Enter Operable Unit name of observation area, if applicable.

North-South Rocky Flats Grid Code (RF Grid N)

Enter numeric code number (1-17) for location of observation according to Rocky Flats Grid.

East-West Rocky Flats Grid Code (RF Grid E)

Enter alphanumeric code letter (A-U) for location of observation according to Rocky Flats Grid.

Activity Codes (Activity 1 & Activity 2)

Enter primary activity code in Activity column and secondary activity code in Activity 2 column.

Activity Codes:

Fauna:			
0	=	Inactive/Immobile	13 = Socialization/Playing
1	=	In Transit	14 = Being Prey
2	=	Walking/Leisurely Flight	15 = Drinking
3	=	Running/Rapid Flight	16 = Swimming
4	=	Fleeing	17 = Territorial Behavior
5	=	Feeding/Hunting	18 = Dead
6	=	Courtship	19 = Defense of Young
7	=	Nursing/Feeding Young	20 = Giving Birth
8	=	Nesting/Incubating	21 = Sick/Injured
9	=	Nesting/Brooding	22 = Asleep
10	=	Nest Building	23 = In Trap
11	=	Fighting/Aggression	24-49 = (Open)
12	=	Grooming/Preening	

Description of Habitat at Observation Location (Habitat Type 1, Habitat Type 2)

Enter primary habitat code for Habitat Type 1. Enter secondary habitat code for Habitat Type 2. See list below for wildlife habitat codes.

Wildlife Habitat Codes:

Code	Habitat Description	Code	Habitat Description
000	Aquatic and Wetlands Habitats Group	093	Impoundment Edge
	<i>Terrestrial Subgroup</i>	094	Dugout Edge
010	Wet Meadow/Marsh Ecotone	095	Ditch Edge
020	Short Marsh (Carex/Juncus)	100	Woodlands Habitats Group
030	Tall Marsh (Typha/Scirpus)	110	Riparian Woodland (Populus, Salix and Associated)
	<i>Open Water Subgroup</i>	120	Ponderosa Woodland (Pinus ponderosa and Associated)
040	Streams and Rivers	125	Douglas-fir Woodland (Pseudotsuga menziesii and Associated)*
041	Intermittent Stream - Riffle	130	Tree Plantings (Ornamentals and Shelterbelts)
042	Intermittent Stream - Run	200	Shrublands Habitats Group
043	Intermittent Stream - Pool	210	Riparian Shrubland (Salix, Amorpha, and Associated)
044	Persistent Stream - Riffle	211	Riparian Shrubland - Amorpha
045	Persistent Stream - Run	212	Riparian Shrubland - Salix
046	Persistent Stream - Pool	220	Short Upland Shrubland (Symphoricarpos and Associated)
047	Ditch (Drainage/Irrigation) - Riffle	230	Tall Upland Shrubland (Crataegus, Prunus, and Associated)
048	Ditch (Drainage/Irrigation) - Run	240	Rabbitbrush Shrubland (Chrysothamnus and Associated)
049	Ditch (Drainage/Irrigation) - Pool	250	Mountain Mahogany/Bitterbrush Shrubland (Cercocarpus, Purshia, and Associated)
050	Ponds and Impoundments	260	Savannah Shrubland (Rhus, Ribes, Physocarpus, and Associated)
051	Natural Pond - Littoral Zone*	300	Grasslands Habitats Group
052	Natural Pond - Limnetic Zone*	310	Short Grassland (Buchloe, Bouteloua, and Associated)
053	Natural Pond - Profundal Zone*	320	Mixed Grassland (General)
054	Impoundment - Littoral Zone	322	Mesic Mixed Grassland (Agropyron, Bouteloua, Poa, and Associated)
055	Impoundment - Limnetic Zone	323	Xeric Mixed Grassland (Andropogon, Stipa, Muhlenbergia, and Associated)
056	Impoundment - Profundal Zone	324	Reclaimed Mixed Grassland (Planted grass mixtures)
057	Dugout/Excavated Pond - Littoral Zone	325	Overgrazed Pasture
058	Dugout/Excavated Pond - Limnetic Zone	400	Disturbance Habitat Group
059	Dugout/Excavated Pond - Profundal Zone	410	Annual Grass/Forb (Bromus japonicus, Bromus tectorum, Centaurea, Helianthus)
060	Lakes and Reservoirs*	420	Disturbed/Barren Lands (Roads, dirt lots)
061	Littoral Zone	430	Cultivated Lands*
062	Limnetic Zone	500	Structures and Structure Associations Habitats Group
063	Profundal Zone	510	Transmission Lines
070	Springs and Seeps	520	Buildings/Structures
071	Persistent	530	Rock and Gravel Piles
072	Intermittent	540	Roadside/Fencerow Complex
080	Groundwater	550	Debris Piles
	<i>Emergent Subgroup</i>	560	Fence
090	Mudflats	600	Special Features Group*
091	Stream Edge	610	Cliffs
092	Natural Pond Edge*	620	Caves

Temperature During Observation (Temp)

Enter temperature in degrees Celsius, enter temperatures below zero with a minus (e.g., -4°C).

Wind Speed (Wind Speed)

Enter approximate wind speed in miles per hour. (If a range is entered on the datasheet, use the rounded average of values [e.g., if 5-10 mph was recorded, the data entry in the database would be entered as 8 mph].)

Wind Direction (Wind Direct)

Enter wind direction using directional code up to 2 letters.

Wind Direction Codes:

N	=	North	S	=	South
NE	=	Northeast	SW	=	Southwest
E	=	East	W	=	West
SE	=	Southeast	NW	=	Northwest

Significant Weather Conditions Present (Weather)**Weather Condition Codes:**

0	=	No significant weather conditions
1	=	Fog/smog, visibility less than 1 km
2	=	Drizzle or mist
3	=	Rain
4	=	Hail
5	=	Snow or sleet
6	=	Thunderstorm
7	=	Blowing sand or dust

Number of Males (Male)

Enter the number of adult males.

Number of Females (Female)

Enter the number of adult females.

Number of Young (Young)

Enter the number of young-of-the-year. These are animals born during the most recent breeding period. For example, a deer born in June will be classified as young-of-the-year until the following June when new fawns are born. Otherwise, young-of-the-year is used for individuals that have not yet reached maturity.

Number of Unclassified Individuals (Un-Classd)

Enter the number of unclassified individuals.

ATTACHMENT A: SPECIES CODES FOR DATA ENTRY

AMPHIBIANS

AMBYSTOMATIDAE

<i>Ambystoma tigrinum</i>	Tiger Salamander	AMTI1
---------------------------	------------------	-------

PELOBATIDAE

<i>Scaphiophus bombifrons</i>	Plains Spadefoot	SCBO1
-------------------------------	------------------	-------

BUFONIDAE

<i>Bufo cognatus</i>	Great Plains Toad	BUCO1
<i>Bufo woodhousei</i>	Woodhouse's Toad	BUWO1

HYLIDAE

<i>Pseudacris triseriatus maculata</i>	Boreal Chorus Frog	PSTR1
----------------------------------------	--------------------	-------

RANIDAE

<i>Rana catesbeiana</i>	Bullfrog	RACA1
<i>Rana pipiens</i>	Northern Leopard Frog	RAPI1

REPTILES

CHELYDRIDAE

<i>Chelydra serpentina</i>	Snapping Turtle	CHSE1
<i>Chrysemys picta</i>	Western Painted Turtle	CHPI1

IGUANIDAE

<i>Phrynosoma douglassi</i>	Short-horned Lizard	PHDO1
<i>Sceloporus undulatus</i>	Eastern Fence Lizard	SCUN1

COLUBRIDAE

<i>Coluber constrictor</i>	Eastern Yellowbelly Racer	COCO1
<i>Pituophis melanoleucus</i>	Bullsnake	PIME1
<i>Thamnophis elegans</i>	Western Terrestrial Garter Snake	PIEL1
<i>Thamnophis radix</i>	Western Plains Garter Snake	THRA1
<i>Thamnophis sirtalis</i>	Red-sided Garter Snake	THSI1

VIPERIDAE

Crotalus viridis

Prairie Rattlesnake

CRVII

BIRDS

PODICIPEDIDAE

Aechmophorus occidentalis

Western Grebe

AEOCI

Podiceps nigricollis

Eared Grebe

PONI1

Podilymbus podiceps

Pied-billed Grebe

POPO1

PELECANIDAE

Pelecanus erythrorhynchos

American White Pelican

PEER1

PHALACROCORACIDAE

Phalacrocorax auritus

Double-crested Cormorant

PHAU1

THRESHKIORNITHIDAE

Plegadis chihi

White-faced Ibis

PLCH1

ARDEIDAE

Casmerodius albus

Great Egret

CAAL1

Ardea herodias

Great Blue Heron

ARHE1

Butorides striatus

Green-backed Heron

BUST1

Nycticorax nycticorax

Black-crowned Night-Heron

NYNY1

ANATIDAE

Aix sponsa

Wood Duck

AISP1

Anas acuta

Northern Pintail

ANAC1

Anas americana

American Wigeon

ANAM1

Anas clypeata

Northern Shoveler

ANCL1

Anas crecca

Green-winged Teal

ANCR1

Anas cyanoptera

Cinnamon Teal

ANCY1

Anas discors

Blue-winged Teal

ANDI1

Anas platyrhynchos

Mallard

ANPL1

Anas strepera

Gadwall

ANST1

Aythya affinis

Lesser Scaup

AYAF1

Aythya americana

Redhead

AYAM1

Aythya collaris

Ring-necked Duck

AYCO1

Aythya marila

Greater Scaup

AYMA1

Aythya valisineria

Canvasback

AYVA1

Branta canadensis

Canada Goose

BRCA1

Bucephala albeola

Bufflehead

BUAL1

Bucephala clangula

Common Goldeneye

BUCL1

Chen caerulescens
Lophodytes cucullatus
Mergus merganser

Snow Goose
Hooded Merganser
Common Merganser

CHCA1
LOCU1
MEME1

CATHARTIDAE

Coragyps atratus
Cathartes aura

Black Vulture
Turkey Vulture

COAT1
CAAU1

ACCIPITRIDAE

Accipiter cooperii
Accipiter gentili
Accipiter striatus
Aquila chrysaetos
Buteo jamaicensis
Buteo lagopus
Buteo platypterus
Buteo regalis
Buteo swainsoni
Circus cyaneus
Haliaeetus leucocephalus
Pandion haliaetus

Cooper's Hawk
Northern Goshawk
Sharp-shinned Hawk
Golden Eagle
Red-tailed Hawk
Rough-legged Hawk
Broad-winged Hawk
Ferruginous Hawk
Swainson's Hawk
Northern Harrier
Bald Eagle
Osprey

ACCO1
ACGE1
ACST1
AQCH1
BUJA1
BULA1
BUPL1
BURE1
BUSW1
CICY1
HALE1
PAHA1

FALCONIDAE

Falco columbarius
Falco mexicanus
Falco peregrinus
Falco sparverius

Merlin
Prairie Falcon
American Peregrine Falcon
American Kestrel

FACO1
FAME1
FAPE1
FASPI

PHASIANIDAE

Meleagris gallopavo
Phasianus colchicus

Wild Turkey
Ring-necked Pheasant

MEGA1
PHCO1

RALLIDAE

Fulica americana

American Coot

FUAM1

GRUIDAE

Grus canadensis
Grus americana

Sandhill Crane
Whooping Crane

GRCA1
GRAM1

SCOLOPACIDAE

Numenius americanus

Long-billed Curlew

NUAM1

STRIGIDAE

Asio flammeus

Short-eared Owl

ASFL1

Asio otus

Long-eared Owl

ASOT1

Athene cunicularia

Burrowing Owl

ATCU1

Bubo virginianus

Great Horned Owl

BUVI1

TYTONIDAE

Tyto alba

Barn Owl

TYAL1

APODIDAE

Cypseloides niger

Black Swift

CYNI1

TYRANNIDAE

Empidonax occidentalis

Cordilleran Flycatcher

EMDI1

Empidonax traillii

Willow Flycatcher

EMTR1

LANIIDAE

Lanius ludovicianus

Loggerhead Shrike

LALU1

Emberizinae

Ammodramus bairdii

Baird's Sparrow

AMBA1

MAMMALS

ORDER CHIROPTERA

VESPERTILIONIDAE

Myotis subulatus

Small-footed Myotis

MYSU1

(=*M. ciliolabrum*)

Eptesicus fuscus

Big Brown Bat

EPFU1

Lasiurus cinereus

Hoary Bat

LACI1

Myotis lucifugus

Little Brown Myotis

MYLU1

MOLOSSIDAE

Tadarida brasiliensis

Brazilian (Mexican) Freetail Bat

TABE1

ORDER LAGOMORPHA

LEPORIDAE

<i>Lepus californicus</i>	Black-tailed Jackrabbit	LECA1
<i>Lepus townsendii</i>	White-tailed Jackrabbit	LETO1
<i>Sylvilagus audubonii</i>	Desert Cottontail	SYAU1

ORDER RODENTIA

SCIURIDAE

<i>Cynomys ludovicianus</i>	Black-tailed Prairie Dog	CYLU1
<i>Sciurus niger</i>	Eastern Fox Squirrel	SCNI1

CASTORIDAE

<i>Castor canadensis</i>	Beaver	CACA1
--------------------------	--------	-------

MURIDAE

<i>Ondatra zibethicus</i>	Muskrat	ONZI1
---------------------------	---------	-------

ZAPODIDAE

<i>Zapus hudsonius preblei</i>	Preble's Meadow Jumping Mouse	ZAHU1
--------------------------------	-------------------------------	-------

ERETHIZONTIDAE

<i>Erethizon dorsatum</i>	Common Porcupine	ERDO1
---------------------------	------------------	-------

ORDER CARNIVORA

URSIDAE

<i>Ursus americanus</i>	American Black Bear	URAM1
-------------------------	---------------------	-------

PROCYONIDAE

<i>Procyon lotor</i>	Raccoon	PRLO1
----------------------	---------	-------

MUSTELIDAE

<i>Mephitis mephitis</i>	Striped Skunk	MEME1
<i>Mustela frenata</i>	Long-tailed Weasel	MUFR1
<i>Mustela vison</i>	Mink	MUVI1
<i>Taxidea taxus</i>	American Badger	TATA1

CANIDAE

Canis latrans
Urocyon cinereoargenteus
Vulpes vulpes

Coyote
Common Gray Fox
Red Fox

CALA1
URCI1
VUVU1

FELIDAE

Felis concolor
Lynx rufus

Mountain Lion
Bobcat

FECO1
LYRU1

ORDER ARTIODACTYLA

CERVIDAE

Cervus elaphus
Odocoileus hemionus
Odocoileus virginianus
Odocoileus hemionus x virginianus

Elk (Wapiti)
Mule Deer
White-tailed Deer
Mule X White-tailed Deer

CEEL1
ODHE1
ODVI1
HEXVI

Appendix B

2000 Preble's Meadow Jumping Mouse Study at the Rocky Flats Environmental Technology Site

1 Introduction

The Preble's meadow jumping mouse (*Zapus hudsonius preblei*) is listed as threatened under the Endangered Species Act. The overall goal of Preble's mouse monitoring at the Rocky Flats Environmental Technology Site (Site) is to determine whether changes occur in this species' population numbers or in habitat quality and quantity. Substantial background information must be gathered before such judgments can be made. To address this need, the Site's Integrated Monitoring Plan (IMP; K-H 1999b) calls for monitoring each source population area for Preble's meadow jumping mice on a rotating basis, such that each population and its habitat are monitored every two to three years.

The 2000 field effort to study the Preble's mouse at the Site focused on Woman Creek. The Woman Creek drainage basin extends eastward from the base of the foothills near the mouth of Coal Creek Canyon and flows into Standley Lake. Much of the basin from the headwaters to Indiana Street is located on Department of Energy (DOE) property and remains largely undeveloped.

The objectives of the 2000 study effort were 1) to estimate population size, location, and demographics of Preble's mice in the Woman Creek watershed via a mark-recapture trapping effort, 2) to track individual mouse movement/behavior through the use of radio telemetry, and 3) to characterize Preble's mouse habitat along Woman Creek in a way that is more comparable to other studies in Colorado.

During 1998 monitoring (K-H 1999a), individuals were captured in new areas of Rock Creek and were observed traveling up to 158 m (518 ft) from the creek channel, though still within connecting seep wetlands. These observations suggest a continuous distribution of Preble's mice in the upper two-thirds of Rock Creek, with at least some individuals dispersing to breed, forage, or find hibernation sites. During Preble's mouse monitoring in Walnut Creek in 1999 (K-H 2000), mice were observed traveling much less on average, and they may have been limited by the discontinuous nature of the habitat in Walnut Creek. Woman Creek tends to have more contiguous stretches of dense vegetation, like that in Rock Creek, so movement patterns similar to those documented in 1998 were expected.

Woman Creek has a relatively dry section below Pond C-2. Past trapping efforts have not documented the presence of Preble's mice in this section of the creek (DOE 1994a; K-H 1998). Currently, however, water that was once diverted through Mower Ditch is directed down the main channel, and additional water is being discharged from Pond C-2 directly into the creek channel, supplying additional water to the lower Woman Creek drainage. Therefore, this stretch was trapped again during 2000 to determine whether Preble's mice had moved into the area.

Preble's mouse habitat within all three major drainages on the Site (Rock, Walnut, and Woman Creeks) has been characterized previously using a consistent methodology. The resulting data have provided important information on basic habitat requirements. To provide additional habitat information, answer new questions, and attempt to provide uniformity of methods with other researchers along the Front Range, a new method, developed in conjunction with other researchers, was used in Woman Creek in 2000. The overall goal of the new method was to

examine habitat at a larger scale to determine whether differences in habitat quality could explain differences in mouse abundance at different locations along the Front Range.

2 Study Questions

The main objectives of the 2000 field effort were to 1) determine the movement patterns of Preble's mice within Woman Creek, 2) monitor particular known population centers in Woman Creek, and 3) estimate the population of mice in Woman Creek above Pond C-2.

2.1 Movement and Dispersal

General question: *What distances do Preble's mice move within the Woman Creek drainage (based on radio telemetry)?*

Specific questions:

- How far do individual mice move in 24 hours?
- How far do individual mice move during the life of the transmitter (20–30 days)?
- Do males and females travel different distances?
- What is the maximum distance perpendicular to the stream at which mice are detected?
- What is the apparent travel route (e.g., through the riparian corridor or otherwise)?
- What are the estimated home ranges of Preble's mice?
- What areas that would currently not be classified as Preble's mouse habitat can be identified as "habitat gaps crossed" or "barriers to movement"?
- What are the largest habitat gaps crossed, and how are they best described in terms of dimensions and habitat characteristics?

2.2 Trapping and Population Estimates

General question: *How many Preble's mice are in the Woman Creek drainage?*

Specific questions:

- What is the population estimate of Preble's mice in Woman Creek on Site?
- What are the age and sex ratios of this population?
- Are there differences in demography between early and late trapping sessions?

- What is the estimated over-summer residency/survival rate?
- Are Woman Creek 2000 population estimates comparable to those from 1997?
- Are there now Preble's mice present below Pond C-2?

2.3 Vegetation Type/Habitat Characteristics

General question: *How do habitat measures in Woman Creek compare to measures taken off site?*

Specific questions:

- How does plant species composition compare to other sites along the Colorado Front Range Urban Corridor?
- How do physical habitat parameters compare to other sites along the Colorado Front Range Urban Corridor?
- How does vegetation structure compare to other sites along the Colorado Front Range Urban Corridor?
- Can nesting sites or hibernacula be characterized in Woman Creek?

3 Methods

3.1 Trapping

To estimate the population of Preble's mice, a sampling frame that encompasses all suitable and known habitat within Woman Creek, from the western Site boundary to Pond C-2, was drawn on a map (Figure 1). This sampling frame consists of 16 1-hectare (2.5 acres; approximately 200×50 m) sampling sites, from which 10 sites were selected at random for trapping (Figure 2). Within each selected site, a transect of 50 traps was established as two rows of 25 traps each, on either side of the stream channel. Traps were spaced approximately 5 m (16 ft) apart, following the densest part of the riparian vegetation. A transect is considered a representative sample of a site.

These transects were trapped during two sessions. The first session was from May 30th to June 20th, and the second was from August 21st to September 14th. Each transect was trapped for seven consecutive days each session. Traps were washed with a bleach solution between sessions, and again at the end of all trapping. Two additional transects of 50 traps each were placed downstream of Pond C-2 (Figure 2). These were trapped during the first session only and were for use in determining presence/absence of Preble's mice only.

Trapping followed the procedures for small mammals outlined in the *EMD Operating Procedures Manual Volume V* (DOE 1994b) and conformed to the U.S. Fish and Wildlife Service *Interim Survey Guidelines for Preble's Meadow Jumping Mouse* (USFWS 1999). Animals were trapped in Longworth and Sherman small-mammal live traps using Purina® Sweet Feed as bait. Each small mammal captured was identified by species, age, and sex. Any evidence of breeding activity, such as lactating or pregnant females and breeding males, was noted. Each Preble's mouse captured was measured for key identifying characteristics, including head and body length, tail length, ear length, hind-foot length, and body weight.

Weather conditions were recorded at the time the traps were checked. All data were recorded on approved field data sheets, entered into the Ecology database, verified, and validated.

3.2 Marking

Population estimates relied on the mark-recapture method. Every Preble's mouse was marked using a passive integrated transponder (PIT) tag, which serves as permanent identification for that individual. Protocols for inserting PIT tags into the mice, developed by the Preble's Mouse Science Team in the spring of 1998, were followed. All Preble's mice caught were scanned with a PIT tag reader to determine whether they had been marked previously.

3.3 Radio Telemetry

Procedures for telemetry tracking of Preble's mice were developed initially at the U.S. Air Force Academy by the Colorado Natural Heritage Program, and were adopted by the Preble's Mouse Science Team. Site ecologists have refined these procedures since the start of telemetry tracking on Site to optimize site-specific results.

Two Telonics, Inc., Model TR-2 receivers were used to monitor the collared mice, with a TR-1 receiver available to serve as back up. The transmitters operated at individual frequencies between 172 and 174 MHz.

Preliminary waystations were established at locations on each side of the creek that offered a clear line of sight to a large area. New waystations were established when collared mice moved into new areas or when a new waystation was more efficient for taking readings. Coordinates for all waystations were obtained using a Trimble® global positioning system (GPS) unit that provided sub-meter accuracy.

Adult Preble's mice were fitted with radio collars until the supply of collars ran out. Telemetry tracking began as soon as the first mouse was collared. Collared mice were tracked at night during the first session, and during the day through the second session, because previous telemetry results have shown that individuals travel much less as their hibernation time approaches.

Locations of collared individuals were estimated by triangulation from the previously established waystations. Compass bearings were taken from three to five waystations per triangulation, with the last bearing being taken within an hour of the first. Each bearing set was checked using a QBASIC program on a laptop in the field truck that graphed the waystations and the recorded bearings. If a bearing set did not form a closed triangulation, the set was discarded and a new set was taken from a different group of waystations, if possible.

Locations of individuals were estimated a minimum of twice per 24-hour period for the life of the transmitter. Once a week during the day, transmitter signals were followed directly to the individual, so that a visual determination of the well-being of the individual could be made. These visual observations also provided the opportunity to locate day-nests. Photographs were taken of several day-nest locations to document habitat and position relative to the stream.

3.4 Habitat Characterization

Ten transects for Preble's mouse habitat characterization were located randomly between the western boundary fence and Pond C-2 (Figure 3). Transects were 50 m (164 ft) in length, starting at the stream bank and extending perpendicularly out from the stream channel. Five transects were placed on the south side and five on the north. The width of the stream channel and the riparian vegetation were measured at the location of each transect.

Five 1-m² quadrats were placed along each transect at the 0-, 5-, 15-, 25-, and 50-m points, on the right-hand side facing away from the stream (Figure 4). At each quadrat, physical and vegetation parameters were measured (Table 1). Physical parameters included slope angle,

slope aspect, slope position, moisture gradient, soil texture, and distance to canopy edge. Vegetation parameters included species richness, dominant associations, canopy species, herbaceous density, and estimates of percent tree, shrub, short shrub, graminoid, and forb cover. Measurements using a spherical densiometer for tree and shrub cover were made from the center of the quadrat in the four cardinal directions at a height of 1 m (3.3 ft). Herbaceous density was measured using a vegetation profile board (1 m² graduated by decimeters; after Nudds 1977), read at a distance of 10 m (33 ft) and a height of approximately 1 m. Visual estimates of tree, shrub, short shrub, graminoid, and forb cover within the quadrat were made using a cover class system: 1 = <5%, 2 = 6–25%, 3 = 26–50%, 4 = 51–75%, and 5 = >76%.

4 Data Analysis

4.1 Mark-Recapture Data

Preble's mouse mark-recapture data were analyzed by Bruce Lubow of Colorado State University using Program MARK[®]. Capture probabilities and mouse densities were estimated with the immigration and emigration rates assumed to be zero (closed population estimate). Because none of the individual mice caught in the first session were re-caught during the second session, the residency/survival rate was also assumed to be zero. The estimated variances for these calculations are reported as standard error (se).

4.2 Telemetry Tracking Data

ArcView[®] 3.1 was used to process and analyze the telemetry data. The geometric center of a closed triangulation was used as the estimated location of the collared individual. The size of each triangulation polygon was used to derive the uncertainty of the estimates. Post-processing of the data was required to help account for signal bounce and interference. Extraneous bearings that increased the uncertainty of an estimate were discarded, as long as a minimum of three bearings remained in the set. Bearings that did not form closed triangulations were adjusted by up to 5°, if this allowed for closure. Bearing sets that still did not form a closed triangulation, or whose area was ≥ 0.5 ha, were discarded entirely. Distances were calculated from the resulting set of location points for each individual.

4.3 Habitat Measurements

Descriptive summaries of the data were prepared and reported for both the entire drainage and by discrete distances from the stream, where appropriate.

5 Results

5.1 Trapping Results

Trapping resulted in a total of 7,700 trap nights over both sessions. During these trap nights, 2,337 small mammal captures were made, 36 of which were of Preble's mice. Table 2 provides a breakdown by species, age, and sex of all captures made.

Averaged over all transects and both sessions, trap availability for the capture of Preble's mice was 60%, which is equivalent to 4,620 available trap nights over the season. Traps considered unavailable to Preble's mice are those that captured other small mammal species, that were sprung but empty, that were disturbed by raccoons or other animals, or that were otherwise not functioning properly.

A total of 22 individual Preble's mice were captured over the season. (Of the 36 recorded captures, 16 were re-captures of the same individuals.) During the first session, 11 individuals were caught (15 captures)—8 adult males and 3 adult females. No Preble's mice were caught at the transects below Pond C-2 (Z00-101 and Z00-102) during the first session. Because these transects were not a part of the mark-recapture effort, they were not run again during the second session. Over the second session, another 11 individuals were captured (21 captures)—5 adult males, 4 adult females, and 2 juvenile males. None of the individuals caught in the first session were re-captured in the second session, and none of the individuals captured during 2000 were marked from previous years.

Preble's mice were captured at 9 of the 12 transects trapped. Transects with no captures were Z00-93, Z00-101, and Z00-102 (Figure 2). Capture locations spanned the entire upper two-thirds of the creek. The maximum distance away from the stream channel at which a Preble's mouse was captured was approximately 15 m (49 ft). This is, of course, a product of where the traps were placed. Traps were generally located along either side of the stream channel, but if dense habitat diverged from the channel, the habitat was followed instead of the stream.

5.2 Population Estimation

5.2.1 Capture Probability

Models were estimated with capture probabilities that differed by sex, session, and stream section. Differences between capture and recapture probability were also examined. The best model (model weight $w_i = 83\%$) was the simplest, with a single capture/recapture probability of $23.2\% \pm 3.5\%$. The alternative models had some amount of support. In these, session 2 had higher trapping probabilities than session 1 ($27.3\% \pm 5.1\%$ vs. $18.9\% \pm 4.8\%$, $w_i = 6\%$); females were more easily trapped than males ($28.6\% \pm 6.5\%$ vs. $19.9\% \pm 4.5\%$, $w_i = 6\%$); and captures were more likely than recaptures ($26.5\% \pm 4.8\%$ vs. $19.7\% \pm 4.7\%$, $w_i = 5\%$).

The first two alternatives above are most likely due to bias generated from a single individual, mouse #153, a female caught during the second session who was captured a total of five times. Many Preble's mice caught on Site exhibit "trap-shyness," or learned avoidance of traps. Over the last three years of telemetry tracking at the Site, collared individuals have been documented as residing in or passing through areas containing baited traps, while rarely entering those traps (K-H 1999a, 2000). Mouse #153, however, displayed "trap-happy" behavior, or learned attraction to traps. This created an outlier in the data and introduced a bias to some of the stratified models that were explored.

5.2.2 Residency/Survival Rate

No individual was captured during both sessions, so the apparent residency/survival rate is zero. However, the sample size is too small to estimate residency/survival rates with any confidence—a low capture rate combined with a low density of mice results in a low probability of recapturing marked mice in the second session. Therefore, the residency/survival rate cannot be measured. It is also important to remember that only "apparent" residency and/or survival can be measured, and emigration is indistinguishable from mortality. Therefore, "residency/survival" represents the proportion of animals that survived, remained on the study site, and did not develop "trap-shyness."

5.2.3 Density and Population Estimations

The population was assumed to be closed for the duration of each trapping session (i.e., no permanent migration in or out of the study area). However, because baited traps draw mice from farther away than they may normally forage, an additional assumption was made regarding the actual area from which mice were drawn into the study area. A standardized area expansion factor was developed by Bruce Lubow from telemetry data by White and Shenk (2000), who estimated the proportion of animals trapped in a trapping area that are actually residents of that area. From this was derived a transect extension that can be added to each end of the stream length along which transects are placed to account for animals drawn from adjacent areas. This estimated extension is $41.5 \text{ m} \pm 9.2 \text{ m}$ (se; $136.3 \text{ ft} \pm 30.1 \text{ ft}$). The adjusted length of stream trapped at each site was therefore the length of each transect plus the extension added to either side, but not double counting areas where boundaries of adjacent transects overlapped.

The density estimate for Woman Creek in 2000 is 6.52 ± 1.04 Preble's mice per linear kilometer of stream (Table 3). Assuming that Preble's mice do not occur downstream of Pond C-2, the section of Woman Creek inhabited by Preble's mice on Site is approximately 3.4 km (2 mi) long. This gives a population estimate of 22.2 ± 3.5 mice, which is almost exactly the number of individuals caught (22).

5.3 Telemetry Analysis

Fourteen of the twenty adult Preble's mice captured were fitted with radio transmitter collars. Fifteen collars were purchased at the beginning of the field season, but one was found to be nonfunctional by the time it was needed. Of the 14 collars used, four stayed on the mice until

the batteries ran out, six fell off the mice prematurely, two were found on the bodies of individuals who died of unknown causes, one was eaten (with the mouse) by a rattlesnake, and one was removed by researchers because of concern for the well being of the individual. The high number of collars falling off prematurely was partly due to difficulty in crimping down the collar securely enough. Once a better crimper tool was employed, the percentage of collars that stayed on improved. Battery life ranged from 19 to 25 days. Mice were tracked with telemetry from 1 to 25 days, with the average being 14 days. Five individuals (3 males and 2 females) were tracked for at least 20 days. The telemetry data from these five individuals were used in movement analyses.

Six day-nests were found via telemetry tracking. All day-nests were above-ground mounds of grass approximately 15 cm (6 inches) in diameter, very similar to what has been found in past years and in other drainages. Both males and females used day-nests, and several individuals were tracked to more than one day-nest. No hibernacula or other underground burrows were found this year.

5.3.1 Movement Analysis

The greatest recorded distance of a collared Preble's mouse from water was $73 \text{ m} \pm 15 \text{ m}$ (239 ft \pm 49 ft) away from the stream channel, and about 9 m (30 ft) higher in elevation than the creek. This was mouse #158, an adult male, who spent about half his time in a bowl-shaped depression containing snowberry (*Symphoricarpos occidentalis*) and some coyote willow (*Salix exigua*) on a north-facing slope south of the creek. This distance is derived from telemetry, and so is subject to some uncertainty (see below for uncertainty analysis). The furthest from water that a mouse was physically seen was approximately 22 m (72 ft) from the stream. Two individuals were seen at this distance. Mouse #144 (adult female) was tracked to a grass day-nest on the edge of a chokecherry (*Prunus virginiana*) patch 3 m (10 ft) higher in elevation than the stream channel, and the body of mouse #145 (adult male) was recovered from the top of a grassy, south-facing slope 1.5 m (5 ft) higher than the stream level. Both of these locations were recorded with a GPS unit with sub-meter accuracy.

Total distance ranged for each individual tracked was measured as the straight-line distance between the two furthest points taken for that mouse, regardless of topography, habitat, or relation to the stream channel. While this likely does not realistically reflect actual movements by individuals, any other measurement of movement is subjective and heavily biased by sample size. For the individuals tracked for 20 or more days, distances ranged varied from 238 m to $1,397 \text{ m} \pm 30 \text{ m}$ (781 ft to $4,583 \text{ ft} \pm 98 \text{ ft}$), with the average being 629 m (2,064 ft; Table 4). The maximum distance ranged was by mouse #142, an adult male, and the first Preble's mouse caught in 2000 (Figure 5).

The 24-hour distance was measured as a straight line between two points (telemetry, capture, or visual) with a time span of between 15 and 33 hours. The average 24-hour distance was 68 m (223 ft; standard deviation 75 m [246 ft], $n = 105$). The greatest distance ranged within a 24-hour period was $443 \text{ m} \pm 30 \text{ m}$ (1,453 ft \pm 98 ft), and was also by mouse #142. If this individual's movements followed the stream channel, as seems likely given the pattern of all points recorded for #142, the distance traveled would be closer to 476 m (1,562 ft).

5.3.2 Uncertainty Analysis

Telemetry triangulation is subject to measurement error. Signal interference and bounce are major contributors to uncertainty in telemetry tracking. As a way of measuring this uncertainty, an "error radius" was derived for each triangulation polygon created by a bearing set (Figure 6). Error radii ranged from 0.1 m to 38.5 m (0.3 ft to 126.3 ft); the maximum is artificial, because points with an error polygon >0.5 ha [1.2 ac] were discarded). The mean is 11.8 m (38.7 ft), but because the distribution of error radii is highly left-skewed, the root mean square of the error radii (15 m [49 ft]) was used instead as a more realistic representation of the uncertainty of the telemetry points (Figure 7).

5.3.3 Comparisons With Previous Data

This is the third year that Preble's mice have been tracked with telemetry at the Site. Work was conducted primarily in the Rock Creek drainage in 1998, Walnut Creek in 1999, and Woman Creek in 2000. Analyses were done that combined and compared the data from all three drainages.

Distance from water was measured to all telemetry and visual observation points from the three drainages ($n = 739$) using GIS. Distances were measured from either a stream channel or pond, whichever was closest. Ninety-three percent of all points were within 48 m (157 ft) of water, and 66% were within 16 m (52 ft; Figure 8). The maximum distance from water that a collared individual was found in the Walnut Creek drainage was 58 m (190 ft), 73 m (239 ft) in Woman Creek, and 158 m (518 ft) in Rock Creek. While far away from a stream or pond, the individuals recorded at great distances were still found to be traveling within dense vegetation growing around hillside seeps (K-H 1999a). These seeps have discharge rills only 5–8 cm (2–3 in.) wide that may still provide the mice with a source of free water (Murdock 2000, pers. comm.). The majority of hillside seeps are found in the Rock Creek drainage. The distances at which collared individuals were found away from streams or ponds are significantly longer in Rock Creek than either Walnut or Woman Creeks (Kruskal-Wallis ANOVA on Ranks, $P < 0.001$).

Another set of comparative analyses were done by looking at the distances ranged by those individual Preble's mice that were tracked for at least 20 days (Table 5). This criterion limits the amount of bias due to sample size; however, it also severely limits the number of samples. In Rock Creek, there were only eight individuals tracked for at least 20 days, and there were only nine in Walnut Creek and five in Woman Creek. Distance ranged was measured as the straight-line distance between the two most distant points taken for that mouse, regardless of topography, habitat, or relation to the stream channel. Individuals in Walnut Creek ranged significantly less than the mice in the other two drainages (one-way ANOVA, $P = 0.048$). When compared by sex instead of by drainage, females ($n = 9$) ranged over significantly shorter distances than males ($n = 13$; t-test, $P = 0.045$). The majority of females tracked for 20 or more days were from Walnut Creek (six, versus one from Rock Creek and two from Woman Creek), while Rock Creek had the majority of males (seven, versus three each from the other drainages). There was no significant difference in average distance ranged between individuals tracked during the early versus late sessions.

5.4 Habitat Characterization

A total of 102 plant species were recorded during habitat characterization of Woman Creek in 2000 (Table 6). Of these, 69% were native species. Analyzed by distance to stream, the greatest mean number of species per quadrat was 10.2, from the 15-m (49-ft) distance category (Figure 9). As expected, the dominant species associations near the stream were riparian woodland and shrubland types, which changed to mesic grassland farther upgradient (Figure 10).

Figure 11 shows percent cover at the five distance categories. Tree canopy was present within only 5 m (16 ft) of the stream, and plains cottonwood (*Populus deltoides*) and Siberian elm (*Ulmus pumila*) were the only tree species recorded. Shrubs were also primarily within 5 m of the stream. Species included coyote willow (*Salix exigua*), leadplant (*Amorpha fruticosa*), and choke cherry (*Prunus virginiana*). A small amount of shrub canopy (6%) was also found at the 50-m (164-ft) distance, coinciding with an old irrigation ditch that paralleled the stream. Short shrub cover ranged between approximately 2% and 7% up to the 25-m (82-ft) distance category. Forb cover was highest at the 5-m distance (35%) but was present throughout. Graminoid cover increased with increasing distance from the stream, from 20% at 0 m to 70% at 50 m. Tree and shrub cover, as measured with the spherical densiometer, is much lower than the visual estimates, primarily because the densiometer method only records vegetation greater than a meter in height (Figure 12). Herbaceous density (a measure of horizontal vegetation density) was highest at 0 m (94%) and then leveled out around 28–35% from the 15-m category through the 50-m category (Figure 12).

The average width of the stream was 1.8 m (6 ft), and the average width of the riparian vegetation was 16.2 m (53 ft). Soil textures were primarily clayey close to the stream, changing to primarily loamy with increasing distance.

6 Discussion

6.1 Movement and Dispersal

The significantly shorter distances ranged by collared Preble's mice in Walnut Creek, compared to either Rock Creek or Woman Creek, may be due to the differences in the continuity of the habitat. Rock and Woman Creeks have narrow, but largely contiguous, stretches of dense riparian shrubs and trees. Walnut Creek, in contrast, is subdivided by manmade impoundments, resulting in a discontinuous distribution of woody vegetation. However, the differing sex ratios of collared mice in each drainage that were tracked for at least 20 days may be a confounding effect. Sample sizes were too small to determine whether the difference in distances ranged is because females actually travel less, or because the habitat configuration in Walnut Creek restricts mouse movement regardless. However, because sample sizes were slightly larger, and results slightly more confident in the statistical comparison of movement differences when divided by gender than when divided by drainage, gender would appear to be the main source of variation. It is logical that females would be bound to smaller areas than males while their young are still dependent.

A maximum distance of 73 m (239 ft) from the stream channel shows that Preble's mice in Woman Creek are never very far from free water or riparian vegetation. Most points recorded for collared individuals were much closer (40% within 7 m [23 ft], 90% within 29 m [95 ft]), even when individuals were actively traveling, indicating that movement paths follow the stream channel to a large degree.

Determining the home range size of Preble's mice using telemetry data has been one of the primary goals of conducting telemetry tracking on Site. Kernel density estimators have become a popular means of estimating home ranges from wildlife tracking data and have demonstrated more realistic results than older methods (Seaman and Powell 1996; Worton 1989). Many of the unrealistic assumptions of older home range estimators, such as normal distribution, are not necessary with kernel density estimation. Adequate sample size, however, remains a fundamental requirement for accurate and precise results. Seaman et al. (1999) determined that an absolute minimum of 30 observations per animal was required, with at least 50 observations being preferable. From all three years of telemetry data, only 8 of the 28 Preble's mice tracked had at least 30 observations, and only one individual had more than 50 observations.

Home ranges were estimated for these eight individuals using the software The Home Ranger v. 1.5 (Hovey 1999), using a 95% fixed kernel estimate and the least squares cross-validation method to determine smoothing. Estimates were bootstrapped using 1,000 iterations to calculate error. Table 7 presents the results, with minimum convex polygon (MCP) home range and distance ranged included for comparison. Home range estimates derived from the kernel density method ranged from 1.6 to 5.9 ha (4 to 15 acres) with an average coefficient of variation (CV) of 6%. Interpretation of these values as true home ranges should be treated with caution, however, as they represent movement during only 2 to 5 weeks of each individual's active period (14–21 weeks) for a particular year. In contrast, home ranges calculated for Preble's mice at the U.S. Air Force Academy in El Paso County, using the same kernel density estimator

and criteria, averaged 0.8 ha (2 acres; 5% CV; Schorr 2001). The smaller home ranges observed at the Air Force Academy are likely due to the much higher density of mice there than at the Site (see next section).

6.2 Trapping and Population Estimate

The population estimate from the mark-recapture data was nearly identical to the number of individuals captured, implying that the entire population of Preble's meadow jumping mice in Woman Creek was trapped. This is unlikely, however, given the previously documented level of trap-shy behavior in Preble's mice at the Site. The extremely low sample size of both captures and recaptures stretches the limits of the normally robust models used to calculate the population estimate. Because the same analyst used the same methods to derive population estimates for all three drainages, the numbers are presumed to be comparable, if not necessarily accurate. Woman Creek has the highest estimated density of Preble's mice of the three drainages (6.5 mice/km; Table 8). The population numbers presented in Table 8 for Rock and Walnut Creeks (2.7 and 3.6 mice/km, respectively) differ from what was reported previously (K-H 2000), because the original density numbers for each trapping session were mistakenly added instead of averaged. In contrast, the average density of Preble's meadow jumping mice reported for the Air Force Academy from mark-recapture studies in 1998 and 1999 was 48 ± 8 mice per km of stream (Schorr 2001). Meaney et al. (2000) estimated an average density of 40 ± 4 mice per km along South Boulder Creek and several neighboring ditches in Boulder County from 1997–2000 trapping data. These researchers used comparable methods in deriving their density estimates.

The relative abundance of Preble's meadow jumping mice in Woman Creek in 2000 was 0.47 mice per 100 trapnights. In 1997, the relative abundance was 0.37 per 100 trapnights (K-H 1998). The relative abundance was 0.21 in Rock Creek in 1998 (K-H 1999a) and 0.33 in Walnut Creek in 1999 (K-H 2000). Table 9 compares the relative abundance of Preble's mouse captures in Woman Creek over time.

The sex ratio of Preble's mice captured in 2000 was 1 adult female to 1.86 adult males. The proportion of females to males did not differ between trapping sessions. This is a higher proportion of males than was recorded previously in Woman Creek. Unfortunately, individuals were inconsistently marked during the 1997 sampling in Woman Creek, so an exact ratio cannot be determined, but it was somewhere between 1:0.80 and 1:1.13 adult females to males (K-H 1998). The sex ratio of captured Preble's mice in Rock Creek in 1998 was 1:1.75 (K-H 1999a), and the ratio in Walnut Creek in 1999 was 1:2.00 (K-H 2000). The recent skewed sex ratio from Woman Creek is therefore comparable to recent capture results from the other two drainages.

The juvenile-to-adult ratio of Preble's mice was much higher in Woman Creek in 1997 than in any drainage in the past 3 years. In 1997, the Woman Creek Preble's mouse juvenile-to-adult ratio was between 1:4.25 and 1:2.25 (K-H 1998), whereas the ratio in 2000 was 1:10.00. In Rock Creek in 1998, the juvenile-to-adult ratio was 1:11.00 (K-H 1999a), and in Walnut Creek in 1999 it was 1:18.00 (K-H 2000). The low proportion of juvenile Preble's mice captured in the last 3 years is troubling, considering the large numbers of trap nights per effort. Regional literature concerning recent Preble's mouse studies was reviewed for comparison (Meaney et al.

1997, 1999, 2000; Schorr 2001), but the method for determining age, and the number of juveniles captured, are reported inconsistently, such that meaningful comparison was impossible. Because the pelage and overall proportions of a Preble's mouse do not vary once an individual is old enough to leave the nest, age is usually determined by weight. For surveys at the Site, any individual that weighs 15 grams or less is classified as a juvenile. Heavier individuals are considered adults. The category of subadult is not used, because it is considered subjective and of little informational value.

6.3 Habitat Characterization

The habitat characterization results emphasize the very narrow riparian corridors present at Woman Creek, and at Rocky Flats in general. However, despite the limited quantity of dense vegetation and woody cover, Preble's mice continue to persist.

The purpose of changing the habitat characterization method in 2000 was to be able to compare results to other, off-Site, characterization efforts. Unfortunately, poor coordination among area researchers resulted in incomparable results. Site ecologists will return to the earlier method for future studies.

7 Conclusions

The main objectives of the 2000 field effort were to determine the movement patterns of Preble's mice within Woman Creek, monitor particular known population centers in Woman Creek, and estimate the population of mice in Woman Creek above Pond C-2.

Preble's mice move freely within the upper two thirds of the Woman Creek drainage on Site. Preble's mice were neither caught nor tracked below Pond C-2, indicating that a population has not become established in the lower part of the drainage, even with the recent addition of water. If the hydrology downstream of Pond C-2 continues to be more natural than in the past, this area should be re-examined for the presence of Preble's mice in several years.

The area of Woman Creek where the greatest numbers of historical captures was recorded, interestingly, is the one place upstream of Pond C-2 where no Preble's mice were captured in 2000 (Z00-93, Figure 2). Captures were made on both sides of this area, and collared mice moved through it. There is no reason to believe that the population of Preble's mice in Woman Creek is declining—the lack of captures at Z00-93 merely points out that individuals and their offspring do not stay put, and that a population can, over time, fluidly occupy a large stretch of riparian habitat.

There is no evidence that the Woman Creek population has changed since it was last surveyed in 1997. While the number of captures was lower in 1997 than 2000, even though trapping effort was higher, there was less coverage of the main channel of Woman Creek in 1997. Only five transects were placed along the main channel above Pond C-2 in 1997, as opposed to ten in 2000. Previous surveys in Woman Creek involved substantially lower levels of trapping effort, as well as differing methods, so the results cannot be used to track population levels over time.

While the population in Woman Creek appears stable at present, the low numbers of juveniles and skewed sex ratio found in all three drainages on Site within the last three years are troubling, and may indicate that the Site meta-population is becoming nonviable. Alternatively, it could indicate that females and juveniles are less likely to enter traps and that previously reported age and sex ratios were the result of inconsistent identification or classification of individuals. What we know for certain are that 1) Preble's mice are difficult to trap, and 2) Rocky Flats has one of the smallest populations along the Front Range. Because of this, care must be taken to maintain the quality of existing habitat and to minimize take.

Telemetry will not be conducted in 2001. After three years of telemetry tracking in the major drainages on Site, it is unlikely that continued telemetry work will produce sufficient new information to warrant the high level of effort required. Smart Ditch, a branch of Woman Creek, will be surveyed for Preble's mice in 2001, and specific areas of Woman Creek will be revisited to obtain information about over-winter survival of Preble's mice. Additional small mammal surveys will be conducted in the xeric grasslands to assess the general small mammal community, which has not been surveyed since 1994.

8 References

- DOE. 1994a. Ecological Monitoring Program 1993 Annual Report. Prepared by EG&G for the Department of Energy Rocky Flats Field Office, Golden, CO. January.
- DOE. 1994b. EMD Operating Procedures Manual, Volume V: Ecology, 5-21200-OPS-EE: Small Mammal Sampling, 4-E56-ENV-ECOL.06. Department of Energy. Golden, Colorado. December.
- DOE. 1995. Rocky Flats Environmental Technology Site Ecological Monitoring Program 1995 Annual Report. Prepared by EG&G for the Department of Energy Rocky Flats Field Office, Golden, CO. May.
- Hovey, F. 1999. The Home Ranger, version 1.5. Ursus Software, Revelstoke, British Columbia, Canada.
- K-H. 1996. 1996 Annual report: Preble's meadow jumping mouse study at Rocky Flats Environmental Technology Site. Prepared by PTI Environmental Services for Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, Colorado. December.
- K-H. 1998. 1997 Study of the Preble's meadow jumping mouse at Rocky Flats Environmental Technology Site. In: 1997 Annual wildlife survey report. Prepared by Exponent for Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, Colorado. May.
- K-H. 1999a. 1998 Study of the Preble's meadow jumping mouse at the Rocky Flats Environmental Technology Site. In: 1998 Annual wildlife survey report for the Rocky Flats Environmental Technology Site. Prepared by Exponent for Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, Colorado. June.
- K-H. 1999b. Rocky Flats Environmental Technology Site Integrated Monitoring Plan. Kaiser-Hill Company, L.L.C., Rocky Flats Environmental Technology Site, Golden, Colorado. September.
- K-H. 2000. 1999 Study of the Preble's meadow jumping mouse at the Rocky Flats Environmental Technology Site. In: 1999 Annual wildlife report for the Rocky Flats Environmental Technology Site. Prepared by Exponent for Kaiser-Hill Company, Rocky Flats Environmental Technology Site, Golden, Colorado. June.
- Meaney, C.A., A. Deans, N.W. Clippinger, M. Rider, D. Nelson, and M. O'Shea-Stone. 1997. Third year survey for Preble's meadow jumping mouse (*Zapus hudsonius preblei*) in Colorado. Prepared for the Colorado Division of Wildlife, Denver, Colorado. October.
- Meaney, C.A., A. Ruggles, B. Lubow, N.W. Clippinger, and A. Deans. 1999. Preliminary results: Second year study of the impact of trails on small mammals and population estimates

for Preble's meadow jumping mice on City of Boulder Open Space. [DRAFT] Prepared for Greenways Program, City of Boulder Transportation Department, City of Boulder Open Space, and U.S. Environmental Protection Agency, Region 8. February.

Meaney, C.A., Ruggles, A., Clippinger, N., and B. Lubow. 2000. Monitoring for Preble's meadow jumping mice along South Boulder Creek and four ditches. Prepared for City of Boulder Open Space, Boulder, Colorado. October.

Nudds, T.D. 1977. Quantifying the vegetative structure of wildlife cover. Wildlife Society Bulletin 5:113-117.

PNHS. 1996. Investigations of the ecology and ethology of the Preble's meadow jumping mouse at the Rocky Flats Environmental Technology Site. Preliminary draft (no final has been issued). Prepared by the Pawnee Natural History Society and Colorado State University for the Dept. of Energy, Rocky Flats Field Office, Golden, Colorado. January.

Schorr, R.A. 2001. Meadow jumping mice (*Zapus hudsonius preblei*) on the U.S. Air Force Academy, El Paso County, Colorado. Unpublished report to the Natural Resources Branch, U.S. Air Force Academy. 53 pp.

Seaman, D.E. and R.A. Powell. 1996. An evaluation of the accuracy of kernel density estimators for home range analysis. Ecology 77(7):2075-2085.

Seaman, D.E., J.J. Millspaugh, B.J. Kernohan, G.C. Brundige, K.J. Raedeke, and R.A. Gitzen. 1999. Effects of sample size on kernel home range estimates. J. Wildl. Manage. 63(2):739-747.

USFWS. 1999. Interim survey guidelines for Preble's meadow jumping mouse. U.S. Fish and Wildlife Service, Denver Field Office, Lakewood, CO. May.

White and Shenk. 2000. Personal communication (conversation on January 18 with M.M. Fink, Exponent, Boulder, CO). Colorado Division of Wildlife, Fort Collins, CO.

Worton, B.J. 1989. Kernel methods for estimating the utilization distribution in home-range studies. Ecology 70(1):164-168.

Table 1. Preble's mouse habitat characterization parameters

Parameter	Variables	Method
Distance to canopy edge	Nearest contiguous riparian canopy. Does not include snowberry, rose, or skunkbush sumac (m)	Meter tape
Dominant associations	Primary, Secondary	RFETS codes
Foliar cover	Percent for tree, shrub, subshrub, grass, forb	Cover classes
Moisture gradient	Hydric, humic, mesic, xeric	Visual estimate
Quadrat canopy position	In, out, edge	Visual estimate
Shrub canopy species	Species code	RFETS codes
Slope angle	0–90°	Clinometer
Slope aspect	360°	Compass
Slope position	Piedmont, top, upper, middle, bottom, riparian	Visual estimate
Soil texture	Cobbly, gravelly, sandy, loamy, silty, clayey	Visual estimate
Tree canopy species	Species code	RFETS codes
Veg. vertical density	Portion of m ² grid (%)	Vegetation board
Width of riparian vegetation	Measure from streambank to edge of hydric vegetation association (m)	Meter tape
Width of stream	Measure of open water or dry, unvegetated stream bed (m)	Meter tape

Table 2. Capture summary for the 2000 trapping effort in Woman Creek¹

Species	Total Captures	Adult	Juvenile	Undetermined	Female	Male	Undetermined
<i>Chaetodipus hispidus</i>	2	2	0	0	0	2	0
<i>Microtus pennsylvanicus</i>	574	472	102	0	293	273	8
<i>Mus musculus</i>	7	7	0	0	1	5	1
<i>Neotoma mexicana</i>	324	229	95	0	161	162	1
<i>Peromyscus maniculatus</i>	1240	1015	224	1	568	646	26
<i>Reithrodontomys megalotis</i>	153	121	32	0	44	107	2
<i>Sorex cinereus</i>	1	1	0	0	1	0	0
<i>Zapus hudsonius preblei</i>	36	32	4	0	14	22	0
Totals	2337	1879	457	1	1082	1217	38

¹ Note that these numbers represent captures, not individuals; some individuals may have been captured more than once.

Table 3. Density estimates of Preble's meadow jumping mice in Woman Creek, 2000

Session	Group	N	Mean	SE	Density (mice/km)			Overall	
					LCL ⁽¹⁾	UCL ¹		Mean	SE
First	Males, May	8.0	5.65	1.60	2.13	15.01			
First	Females, May	3.0	1.65	1.03	0.42	6.46	7.30	1.36	
Second	Males, August	7.2	3.24	1.49	0.97	10.81			
Second	Females, August	4.0	2.51	0.80	0.89	7.02	5.74	1.65	
								6.52	1.04

¹ Log-normal-based confidence interval

Table 4. Preble's meadow jumping mice collared and radio tracked in Woman Creek, 2000

Mouse	Sex	Session	Sample Size ¹	Elapsed Days	Max Distance Covered (m)	Uncertainty (±m)	Max Distance from Stream (m)	Uncertainty (±m)
145	M	1	32	25	745	30	41	15
144	F	1	39	25	238	30	34	15
142	M	1	24	23	1397	30	34	15
143	M	1	22	22	442	30	42	15
153	F	2	60	20	322	30	42	15
152	M	1	38	19	426	30	39	15
158	M	2	43	15	192	30	73	15
146	M	1	11	11	473	30	24	15
147	F	1	12	10	167	30	33	15
148	M	1	9	9	96	30	71	15
149	F	1	8	7	117	30	23	15
155	M	2	17	6	256	30	39	15
151	M	1	3	2	114	n/a	3	n/a
154	F	2	3	1	7	15	5	15

¹ Sample size includes points derived from telemetry estimation and GPS recording of capture locations and visual spotting.

Table 5. Mean distance ranged for individuals tracked 20 or more days, 1998–2000

Grouping Category	Sample Size	Mean (m)	Standard Deviation (m)
Drainage			
Rock Creek	8	695	381
Walnut Creek	9	288	153
Woman Creek	5	629	470
Sex			
Male	13	643	408
Female	9	326	206
Session			
Early	15	595	405
Late	7	340	211
Overall	22	513	370

Table 6. 2000 Preble's meadow jumping mouse habitat characterization species richness

Family	Scientific Name
APIACEAE	<i>Lomatium orientale</i> Coult. & Rose
ASCLEPIADACEAE	<i>Asclepias speciosa</i> Torr.
ASTERACEAE	<i>Achillea millefolium</i> L. ssp. <i>lanulosa</i> (Nutt.) Piper
ASTERACEAE	<i>Ambrosia psilostachya</i> DC.
ASTERACEAE	<i>Artemisia frigida</i> Willd.
ASTERACEAE	<i>Artemisia ludoviciana</i> Nutt. var. <i>ludoviciana</i>
ASTERACEAE	<i>Aster falcatus</i> Lindl.
ASTERACEAE	<i>Aster hesperius</i> A. Gray var. <i>hesperius</i>
ASTERACEAE	<i>Aster porteri</i> Gray
ASTERACEAE	<i>Carduus nutans</i> L. ssp. <i>macrolepis</i> (Peters.) Kazmi
ASTERACEAE	<i>Centaurea diffusa</i> Lam.
ASTERACEAE	<i>Chrysopsis villosa</i> Pursh.
ASTERACEAE	<i>Cirsium arvense</i> (L.) Scop.
ASTERACEAE	<i>Cirsium vulgare</i> (Savi) Ten.
ASTERACEAE	<i>Grindelia squarrosa</i> (Pursh.) Dun.
ASTERACEAE	<i>Lactuca serriola</i> L.
ASTERACEAE	<i>Ratibida columnifera</i> (Nutt.) Woot. & Standl.
ASTERACEAE	<i>Scorzonera laciniata</i> L.
ASTERACEAE	<i>Solidago missouriensis</i> Nutt.
ASTERACEAE	<i>Solidago rigida</i> L.
ASTERACEAE	<i>Sonchus arvensis</i> L. ssp. <i>arvensis</i> L.
ASTERACEAE	<i>Taraxacum officinale</i> Weber
ASTERACEAE	<i>Tragopogon dubius</i> Scop.
BORAGINACEAE	<i>Cynoglossum officinale</i> L.
BORAGINACEAE	<i>Onosmodium molle</i> Michx. var. <i>occidentale</i> (Mack.) Johnston
BRASSICACEAE	<i>Alyssum minus</i> (L.) Rothmaler var. <i>micranthus</i> (C. A. Mey.) Dudley
BRASSICACEAE	<i>Barbarea vulgaris</i> R. Br.
BRASSICACEAE	<i>Lepidium campestre</i> (L.) R. Br.
CACTACEAE	<i>Opuntia macrorhiza</i> Engelm.
CAPRIFOLIACEAE	<i>Symphoricarpos occidentalis</i> Hook.
CARYOPHYLLACEAE	<i>Silene antirrhina</i> L.
CARYOPHYLLACEAE	<i>Vaccaria pyramidata</i> Medic.
COMMELINACEAE	<i>Tradescantia occidentalis</i> (Britt.) Smyth
CONVOLVULACEAE	<i>Convolvulus arvensis</i> L.

Table 6. (cont.)

Family	Scientific Name
CYPERACEAE	Carex eleocharis Bailey
CYPERACEAE	Carex heliophila Mack.
CYPERACEAE	Carex nebrascensis Dew.
CYPERACEAE	Carex praegracilis W. Boott.
CYPERACEAE	Eleocharis macrostachya Britt.
FABACEAE	Amorpha fruticosa L.
FABACEAE	Glycyrrhiza lepidota Pursh.
FABACEAE	Medicago lupulina L.
FABACEAE	Melilotus officinalis (L.) Pall.
FABACEAE	Psoralea tenuiflora Pursh.
FABACEAE	Thermopsis rhombifolia var. divaricarpa (Nels.) Isely
FABACEAE	Vicia americana Muhl. ex Willd.
GERANIACEAE	Erodium cicutarium (L.) L'Her.
GERANIACEAE	Geranium caespitosum James ssp. caespitosum
HYDROPHYLLACEAE	Phacelia heterophylla Pursh.
JUNCACEAE	Juncus balticus Willd.
JUNCACEAE	Juncus torreyi Cov.
LAMIACEAE	Mentha arvensis L.
LAMIACEAE	Monarda fistulosa L. var. menthifolia (Grah.) Fern.
LAMIACEAE	Nepeta cataria L.
LAMIACEAE	Scutellaria brittonii Porter
LINACEAE	Linum perenne L. var. lewisii (Pursh.) Eat. & Wright
MALVACEAE	Sphaeralcea coccinea (Pursh.) Rydb.
NYCTAGINACEAE	Mirabilis linearis (Pursh.) Heimerl
NYCTAGINACEAE	Mirabilis nyctaginea (Michx.) MacM.
ONAGRACEAE	Gaura parviflora Dougl.
OXALIDACEAE	Oxalis dillenii Jacq.
POACEAE	Agropyron desertorum (Fisch.) Schult.
POACEAE	Agropyron intermedium (Host) Beauv.
POACEAE	Agropyron repens (L.) Beauv.
POACEAE	Agropyron smithii Rydb.
POACEAE	Agrostis stolonifera L.
POACEAE	Andropogon gerardii Vitman

Table 6. (cont.)

Family	Scientific Name
POACEAE	<i>Andropogon scoparius</i> Michx.
POACEAE	<i>Aristida purpurea</i> Nutt. var. <i>robusta</i> (Merrill) A. Holmgren & N. Holmgr
POACEAE	<i>Bouteloua curtipendula</i> (Michx.) Torr.
POACEAE	<i>Bouteloua gracilis</i> (H. B. K.) Lag ex Griffiths
POACEAE	<i>Bouteloua hirsuta</i> Lag
POACEAE	<i>Bromus inermis</i> Leyss. ssp. <i>inermis</i>
POACEAE	<i>Bromus japonicus</i> Thunb. ex Murr.
POACEAE	<i>Bromus tectorum</i> L.
POACEAE	<i>Buchloe dactyloides</i> (Nutt.) Engelm.
POACEAE	<i>Festuca pratensis</i> Huds.
POACEAE	<i>Glyceria striata</i> (Lam.) Hitchc.
POACEAE	<i>Koeleria pyramidata</i> (Lam.) Beauv.
POACEAE	<i>Panicum virgatum</i> L.
POACEAE	<i>Poa canbyi</i> (Scribn.) Piper
POACEAE	<i>Poa compressa</i> L.
POACEAE	<i>Poa pratensis</i> L.
POACEAE	<i>Sporobolus asper</i> (Michx.) Kunth
POACEAE	<i>Sporobolus cryptandrus</i> (Torr.) A. Gray
POACEAE	<i>Stipa comata</i> Trin. & Rupr.
POACEAE	<i>Stipa viridula</i> Trin.
ROSACEAE	<i>Geum macrophyllum</i> Willd.
ROSACEAE	<i>Potentilla fissa</i> Nutt.
ROSACEAE	<i>Potentilla gracilis</i> Dougl. ex Hook. var. <i>glabrata</i> (Lehm.) C. L. Hitchc.
ROSACEAE	<i>Rosa arkansana</i> Porter
ROSACEAE	<i>Rosa woodsii</i> Lindl.
SALICACEAE	<i>Salix exigua</i> Nutt. ssp. <i>interior</i> (Rowlee) Cronq.
SANTALACEAE	<i>Comandra umbellata</i> (L.) Nutt.
SCROPHULARIACEAE	<i>Linaria dalmatica</i> (L.) Mill.
SCROPHULARIACEAE	<i>Penstemon virens</i> Penn.
SCROPHULARIACEAE	<i>Verbascum blattaria</i> L.
SCROPHULARIACEAE	<i>Verbascum thapsus</i> L.
SOLANACEAE	<i>Physalis virginiana</i> P. Mill.
TYPHACEAE	<i>Typha latifolia</i> L.
VERBENACEAE	<i>Lippia cuneifolia</i> (Torr.) Steud.
VIOLACEAE	<i>Viola nuttallii</i> Pursh.

Table 7. Home range estimates for individual Preble's mice with sample size ≥ 30 ¹

Mouse ID	Year	Session	Sex	n	Elapsed Days	95% Kernel (ha) ²	Standard Error (ha)	MCP ³ (ha)	Distance Ranged ⁴ (m)
117	1998	early	M	34	36	5.9	0.3	7.2	452
127	1999	early	F	42	36	1.6	0.1	1.8	570
133	1999	early	M	30	23	3.1	0.2	1.6	385
144	2000	early	F	39	25	1.8	0.1	1.2	238
145	2000	early	M	32	25	2.7	0.2	4.5	745
152	2000	early	M	38	19	1.7	0.1	1.2	426
153	2000	late	F	60	20	2.1	0.1	1.9	322
158	2000	late	M	43	15	1.7	0.1	1.1	192

¹ Options used in the Home Ranger software (Hovey 1999) were:

Simulate Bivariate Normal: False

Minimum sample size: 30

Run Batch Mode: True

Home ranges by season: False

Write separate output files: True

Sort input data: False

Bootstrap home ranges: True; number of samples: 1000

Standardize data with multivariate normal scores: False

Initial Random Number Seed = 1802

Calculate Schoener Stats: True

Calculate Swihart Stats: False

Calculate Adaptive Kernel: False Fixed estimate only

Grid Resolution: 200

Simulate Discretization: False

Use Adhoc h: False; Post-hoc adjustment of LSCV h = 1.000.

² Mean of bootstrap results, 1,000 iterations.

³ MCP = Minimum convex polygon.

⁴ Distance ranged is the straight-line distance between the two farthest points.

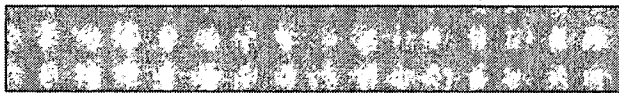
Table 8. Comparison of Preble's mouse mark-recapture analysis results for the three drainages

Drainage	Ave. Density (mice/km) ¹	Stream Length (km)	Population Estimate	Standard Error	Capture Probability	Standard Error
Rock ²	2.7	12.8	35	1	29.6%	6.9%
Walnut ²	3.6	5.5	20	1	30.4%	5.9%
Woman	6.5	3.4	22	4	23.2%	3.5%

¹ Averaged over the entire stream length. Sections of Rock and Walnut Creeks were shown to have different density levels.

² Source: K-H (2000).

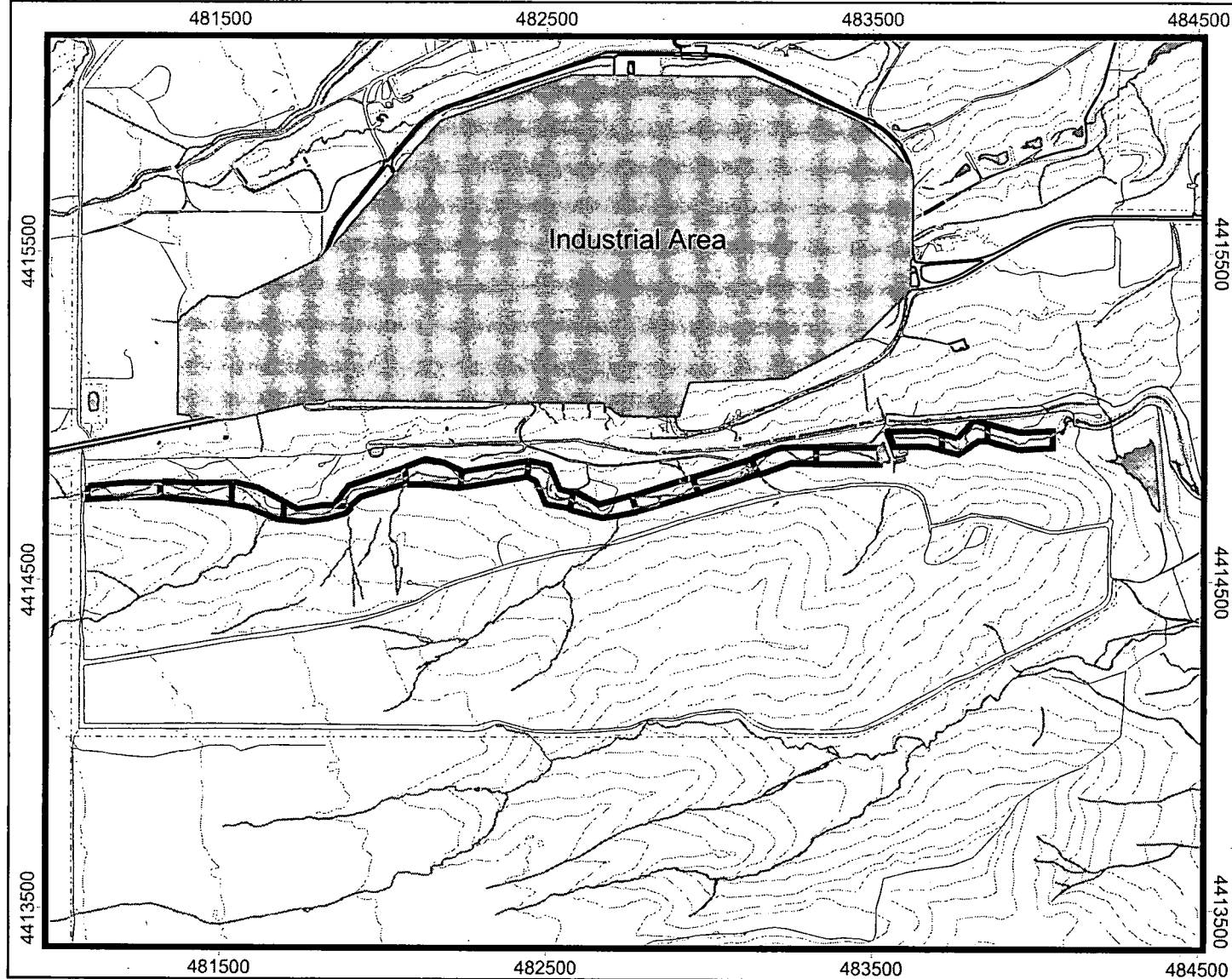
Table 9. Relative abundance of Preble's mice in Woman Creek 1991–2000¹

Year	Trap Nights	Captures	Ratio per 100 Trap Nights
1991 ²	?	1	?
1992 ²	?	2	?
1993	1550	7	0.45
1994 ²	?	0	0.00
1995	1925	1	0.05
1996	1032	3	0.29
1997	9000	33	0.37
1998 ³			
1999 ³			
2000	7700	36	0.47

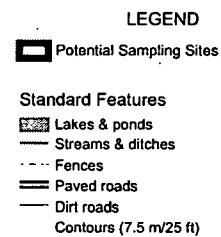
¹ Sources: DOE (1994), PNHS (1996), K-H (1996), K-H (1998).

² Number of trap nights specific to Woman Creek could not be determined from available literature for 1991, 1992, and 1994 trapping efforts.

³ Trapping was not conducted in Woman Creek in 1998 or 1999.

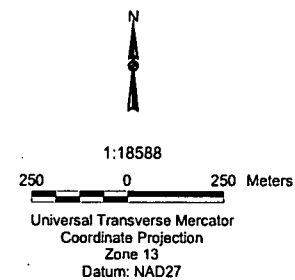


Woman Creek Sampling Frame.
Figure 1.



DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EQ&S RSL, Las Vegas. Digitized from the orthophotographs, 1/85
Hypsography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATITUDE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at ~10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

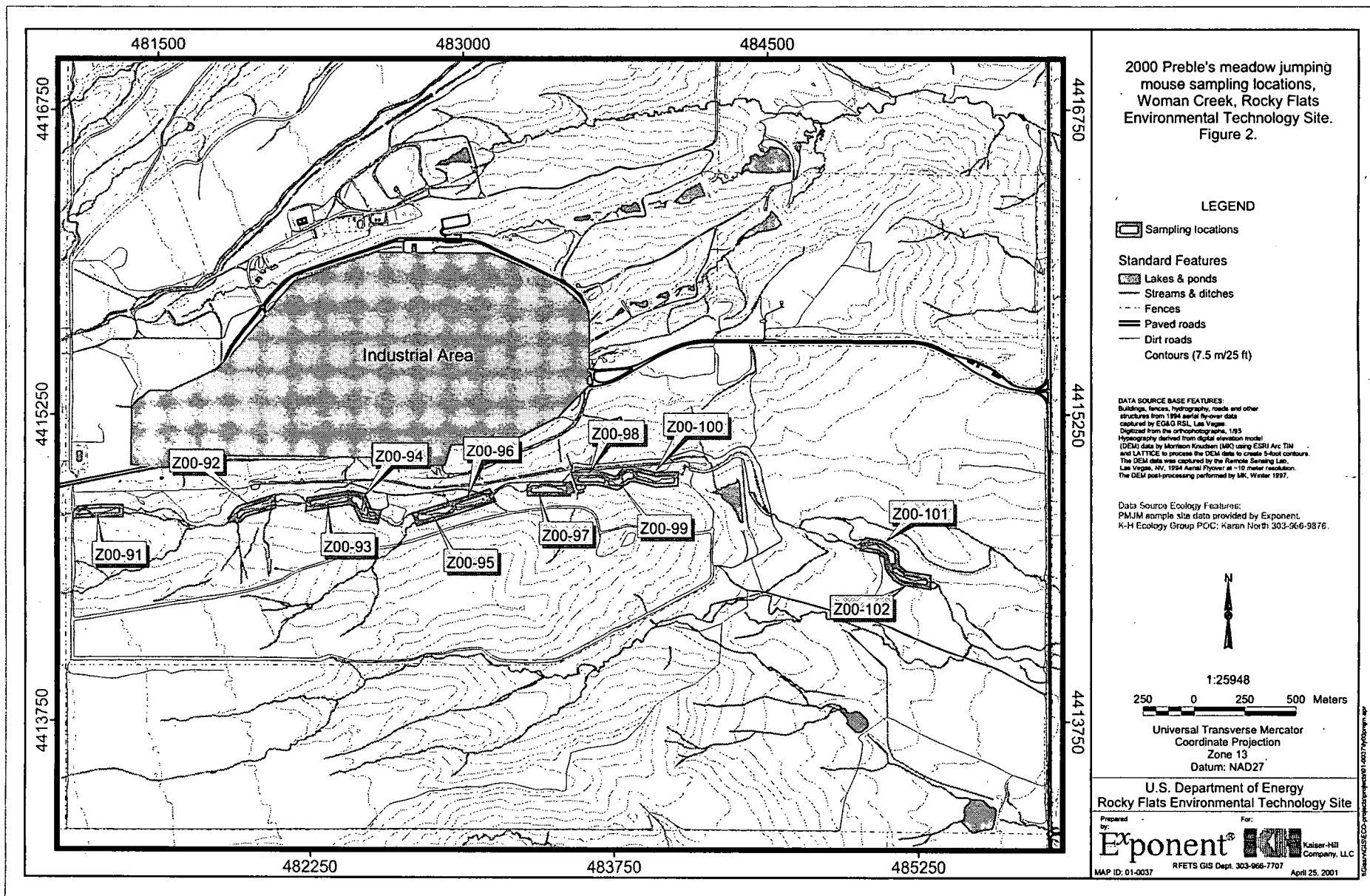
Data Source Ecology Features:
PMJM sample site data provided by Exponent.
K-H Ecology Group POC: Karan North 303-966-9876

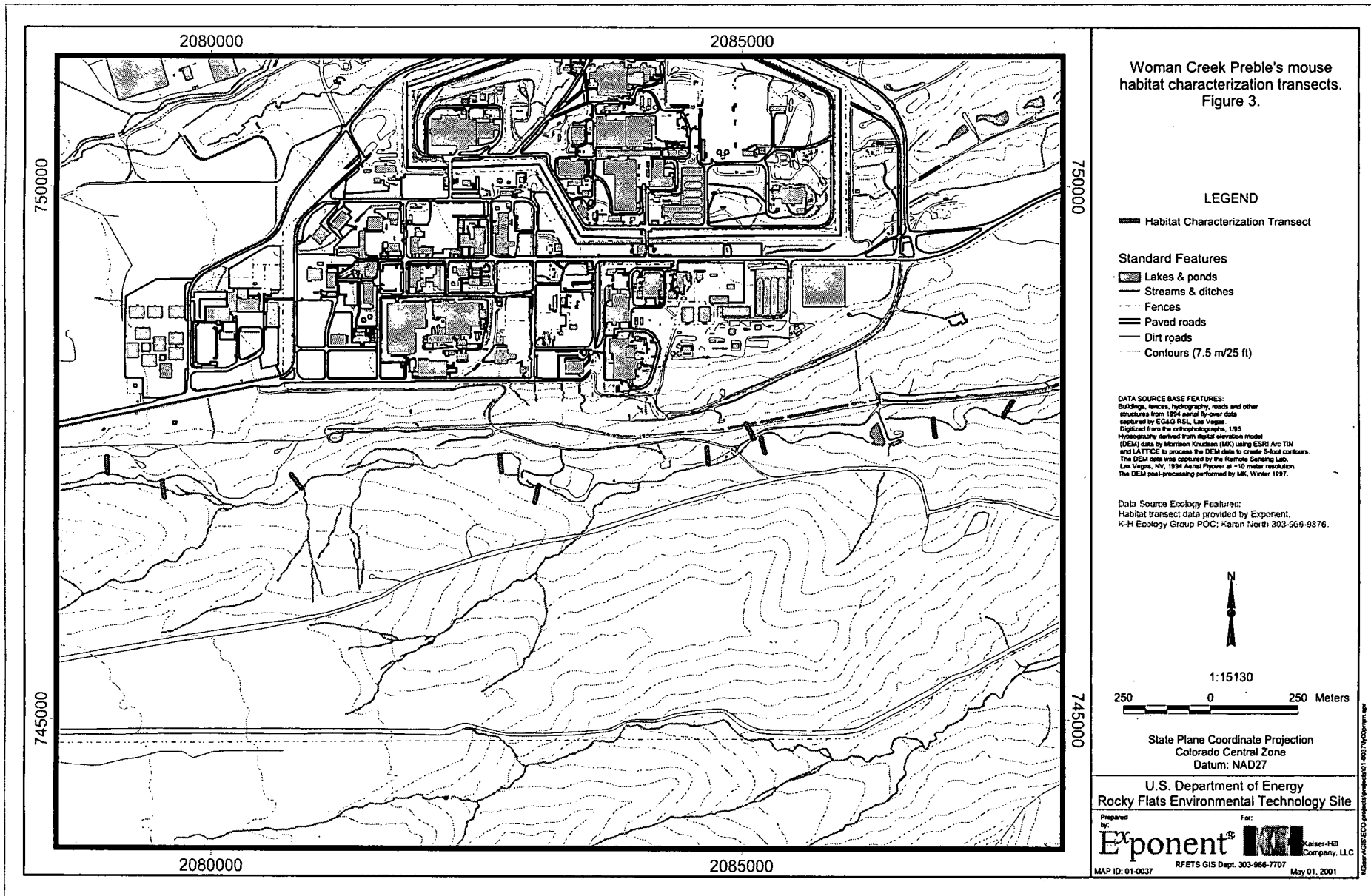


U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **E²xponent[®]** For:  **Kaiser-Hill Company, LLC**

MAP ID: 01-0037 RFETS GIS Dept. 303-968-7707 May 02, 2001





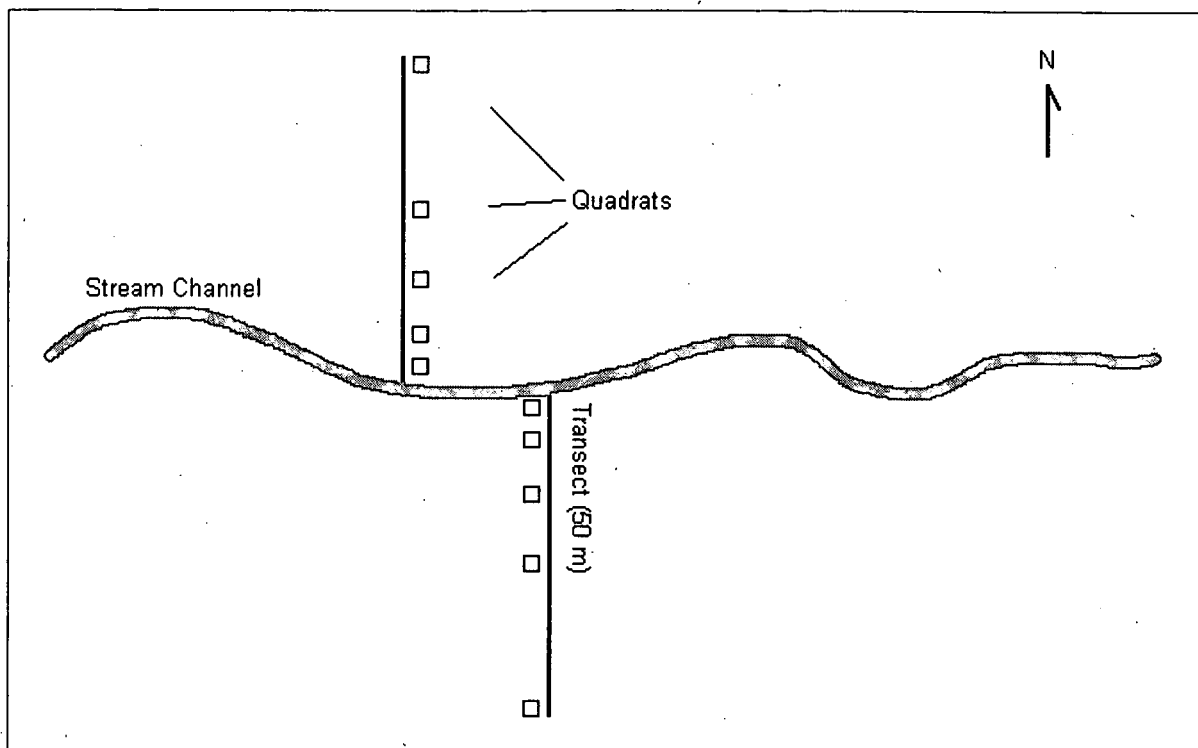
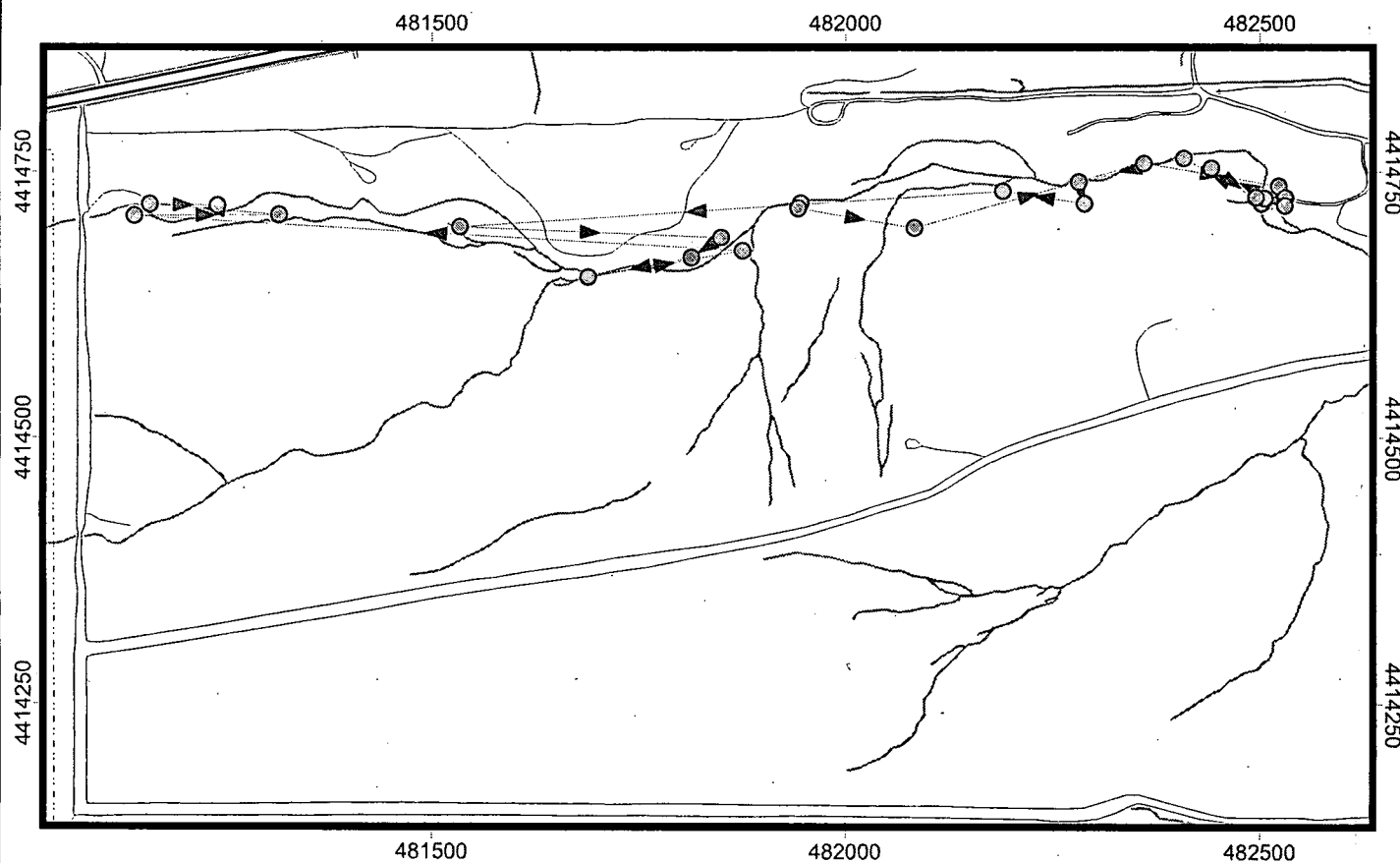


Figure 4. Example of habitat transects with associated quadrats.

Movement of Mouse #142,
tracked with radiotelemetry.
Figure 5.



LEGEND

- Observed positions of mouse #142
- ▲ Movement pattern of mouse #142

Standard Features

- ▭ Lakes & ponds
- Streams & ditches
- - - Fences
- == Paved roads
- Dirt roads

DATA SOURCE BASE FEATURES:

Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs, 1:65
Hydrography derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATTICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1994 Aerial Flyover at 10 meter resolution. The DEM post-processing performed by MK, Winter 1997.

Data Source Ecology Features:

Telemetry points and movement data provided by Exponent.
K-H Ecology Group POC: Karan North 303-966-9876.



1:8444

100 0 100 Meters

Universal Transverse Mercator
Coordinate Projection
Zone 13
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: **Exponent** For: **Kaiser-Hill Company, LLC**

MAP ID: 01-0037 RFETS GIS Dept. 303-966-7707 May 02, 2001

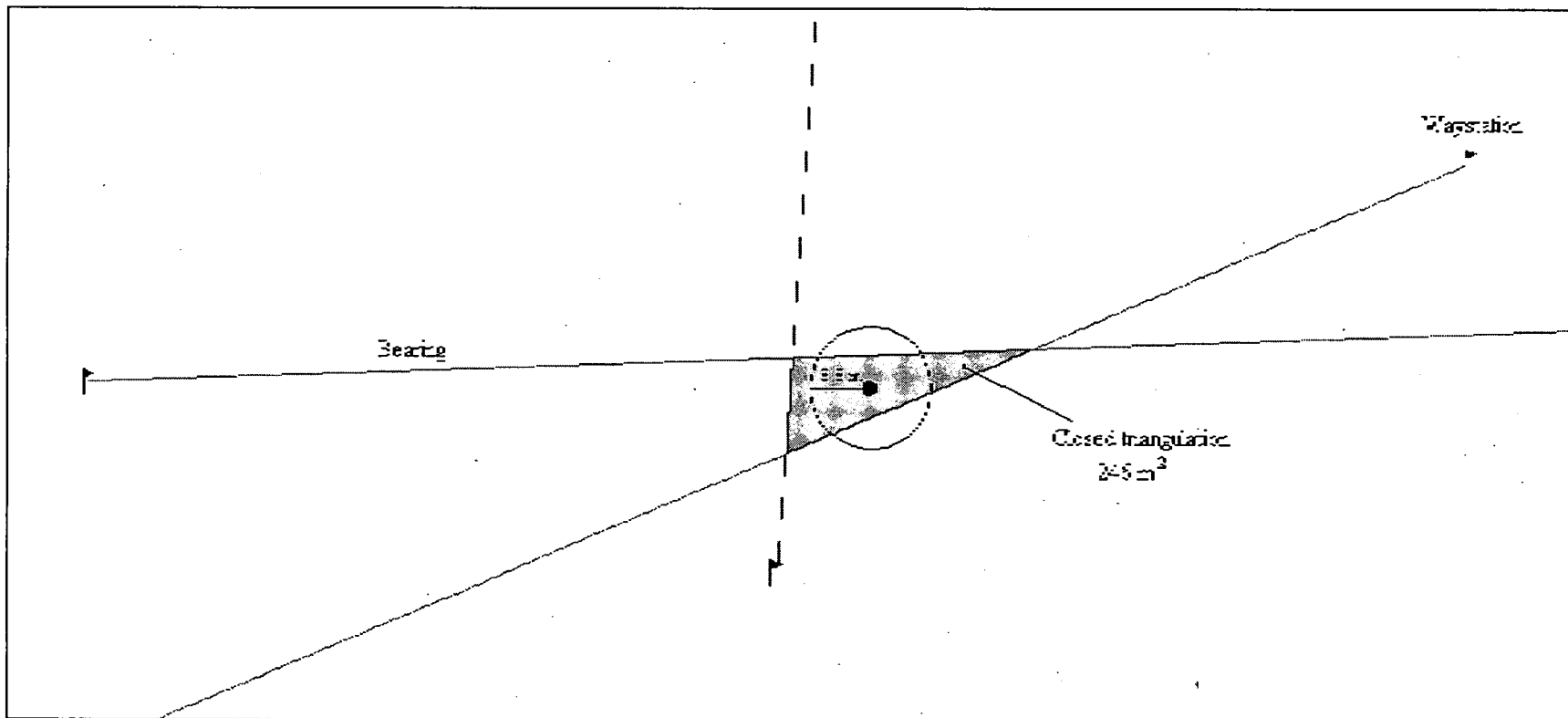


Figure 6. Calculation of error radius from a closed telemetry triangulation.

The error radius is calculated by taking the area of the triangle (246 m² in this example) and using the formula: $r = \sqrt{\frac{A}{\pi}}$ as if the area were a circle, thereby deriving the average error in any direction. In the above example, $r = 8.8$ m.

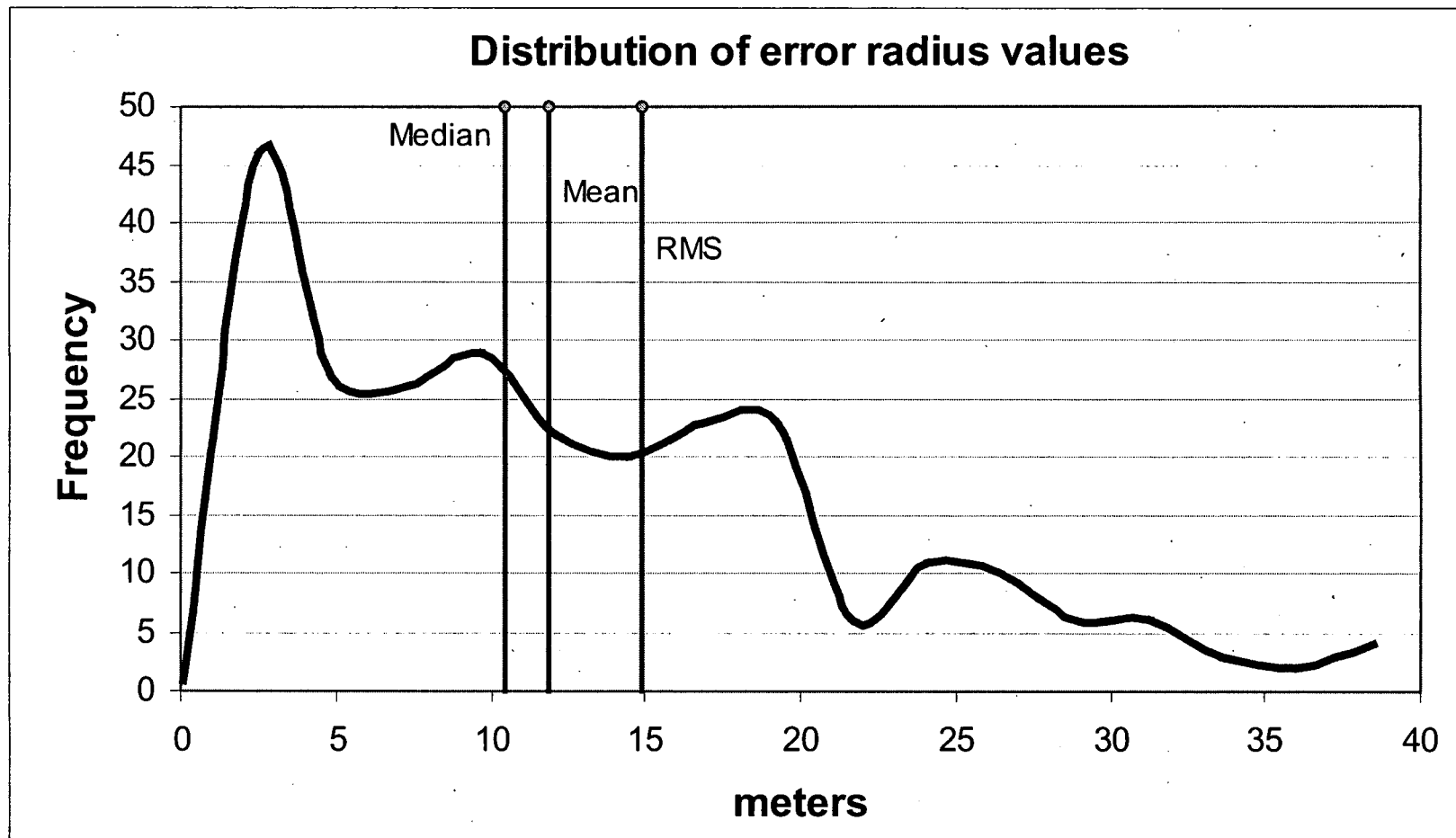


Figure 7. Distribution of error radius values and its summary values.

The following graph shows the frequency distribution of the calculated error radius values and where the median, mean, and root mean square (RMS) fall. Note that because the distribution is strongly left-skewed, the median and mean underestimate the central value, while the RMS provides a better indication of the average magnitude of the error radii.

$$RMS = \sqrt{(\bar{x})^2 + (s)^2} \quad \text{where } \bar{x} \text{ is the mean and } s \text{ is the standard deviation.}$$

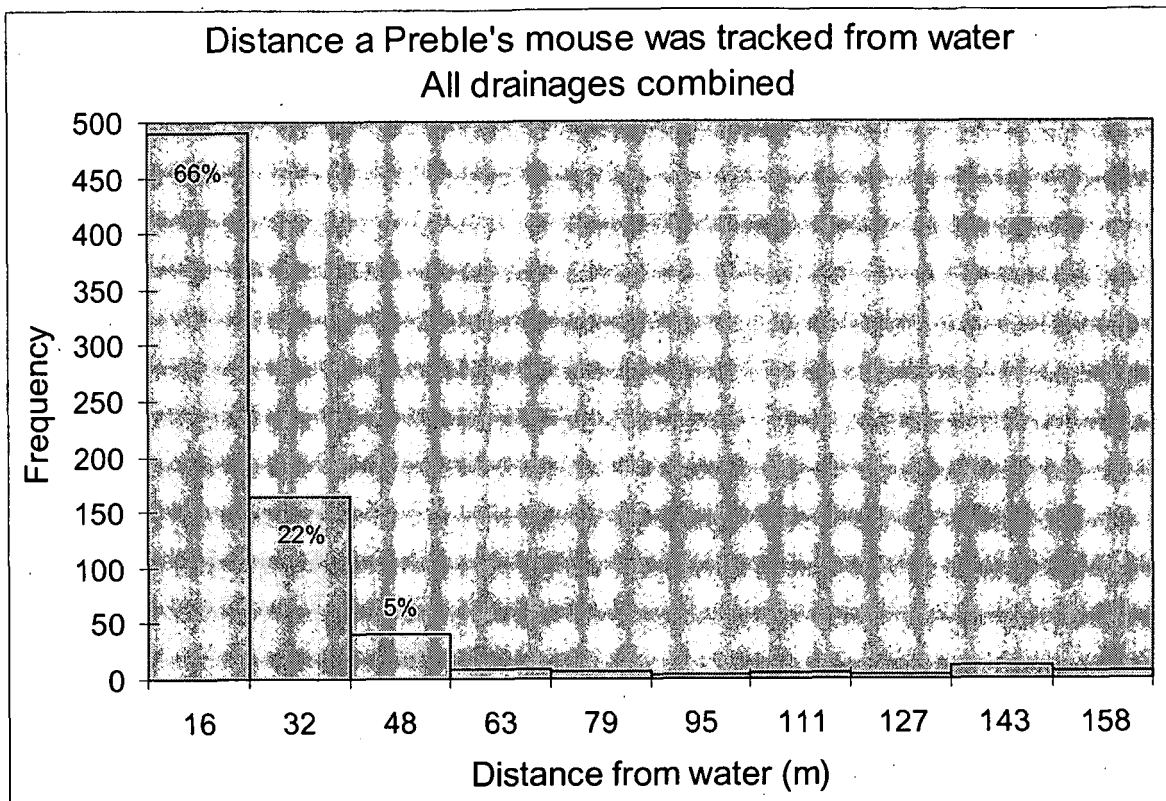


Figure 8. Frequency histogram of distances of Preble's meadow jumping mouse telemetry and visual observation points from a body of water (stream or pond).

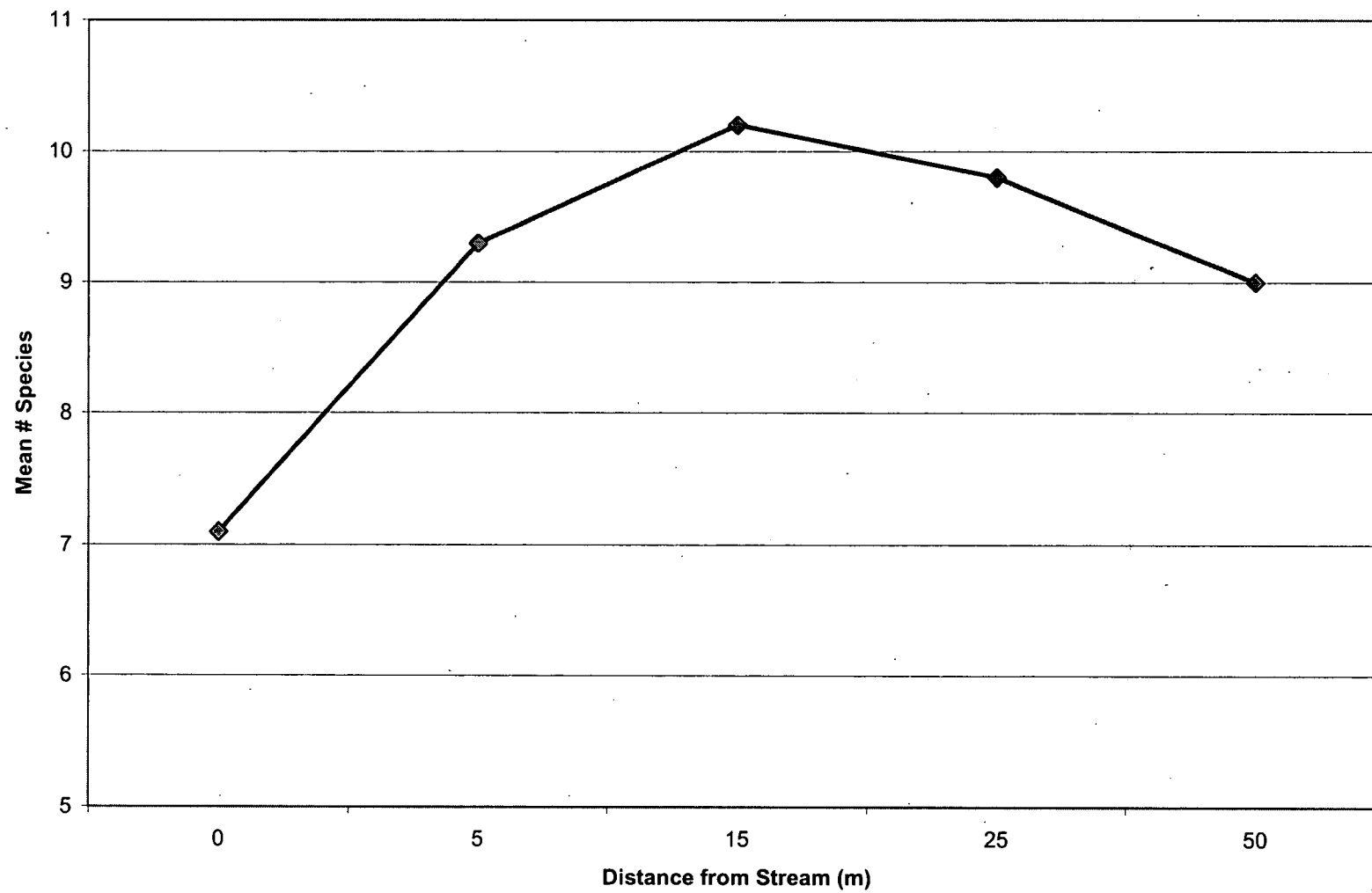


Figure 9. Mean number of plant species at various distances from the stream.

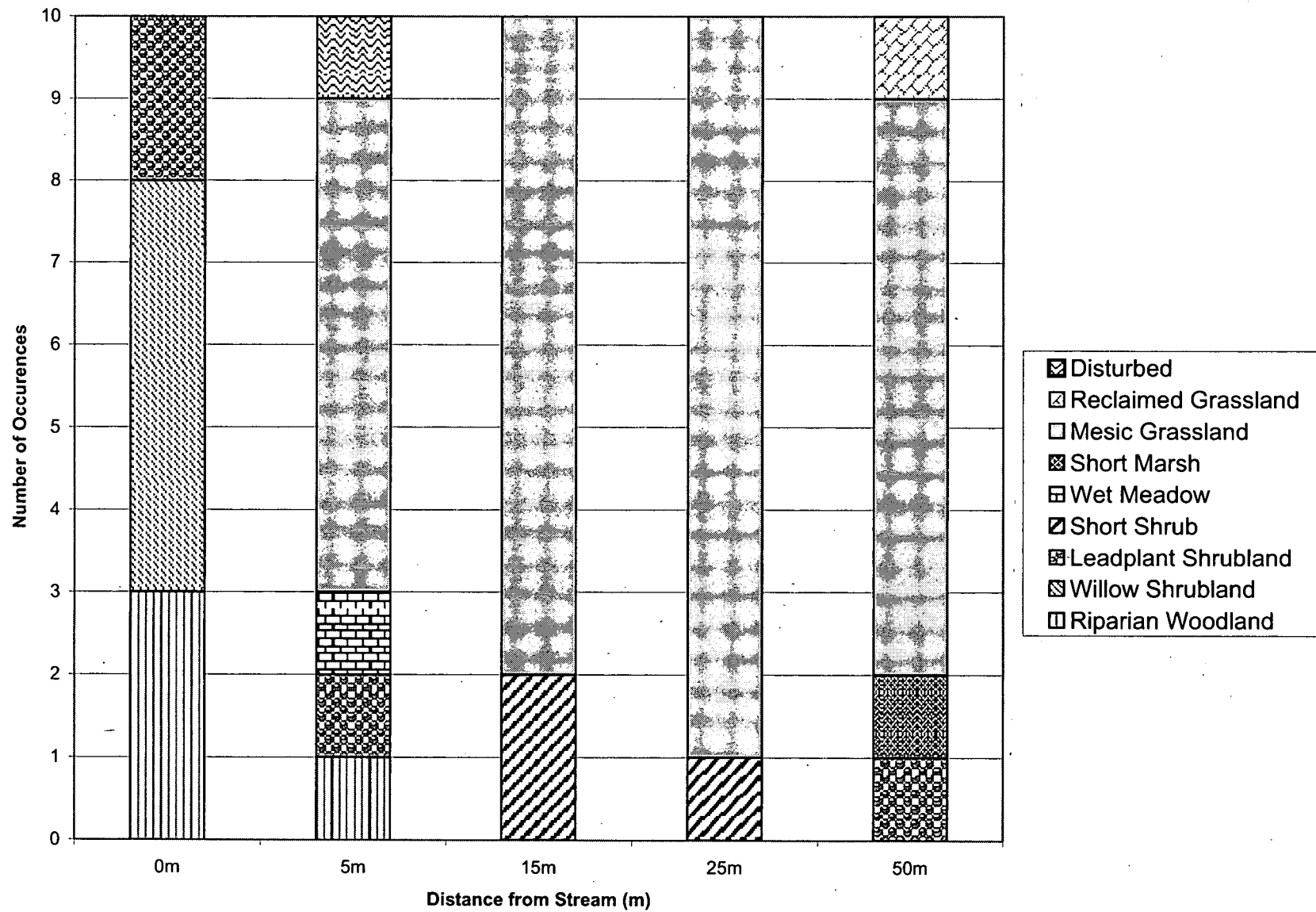


Figure 10. Distribution of habitat types at different distances from the stream in Woman Creek.

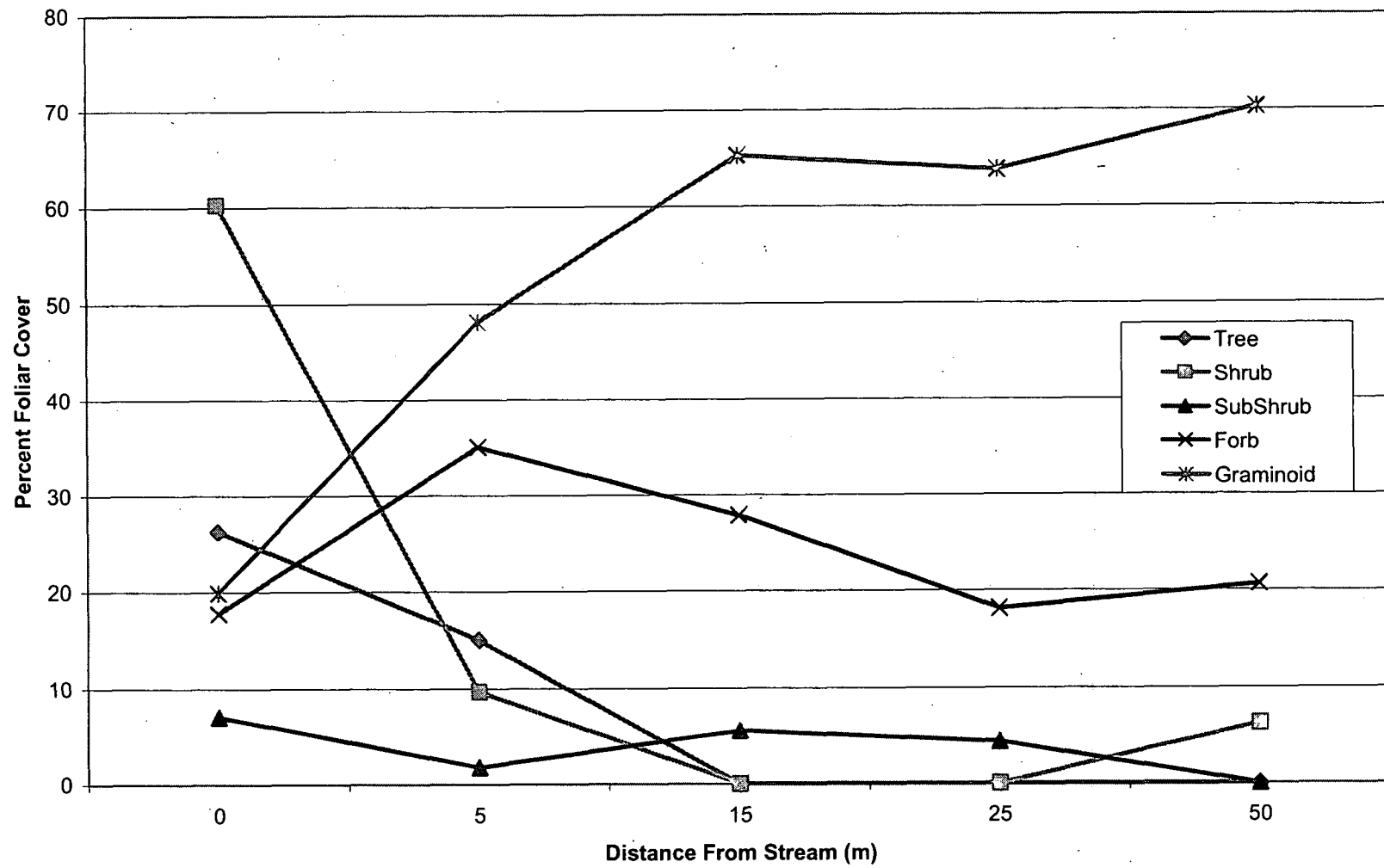


Figure 11. Foliar Cover at Different Distances From Stream

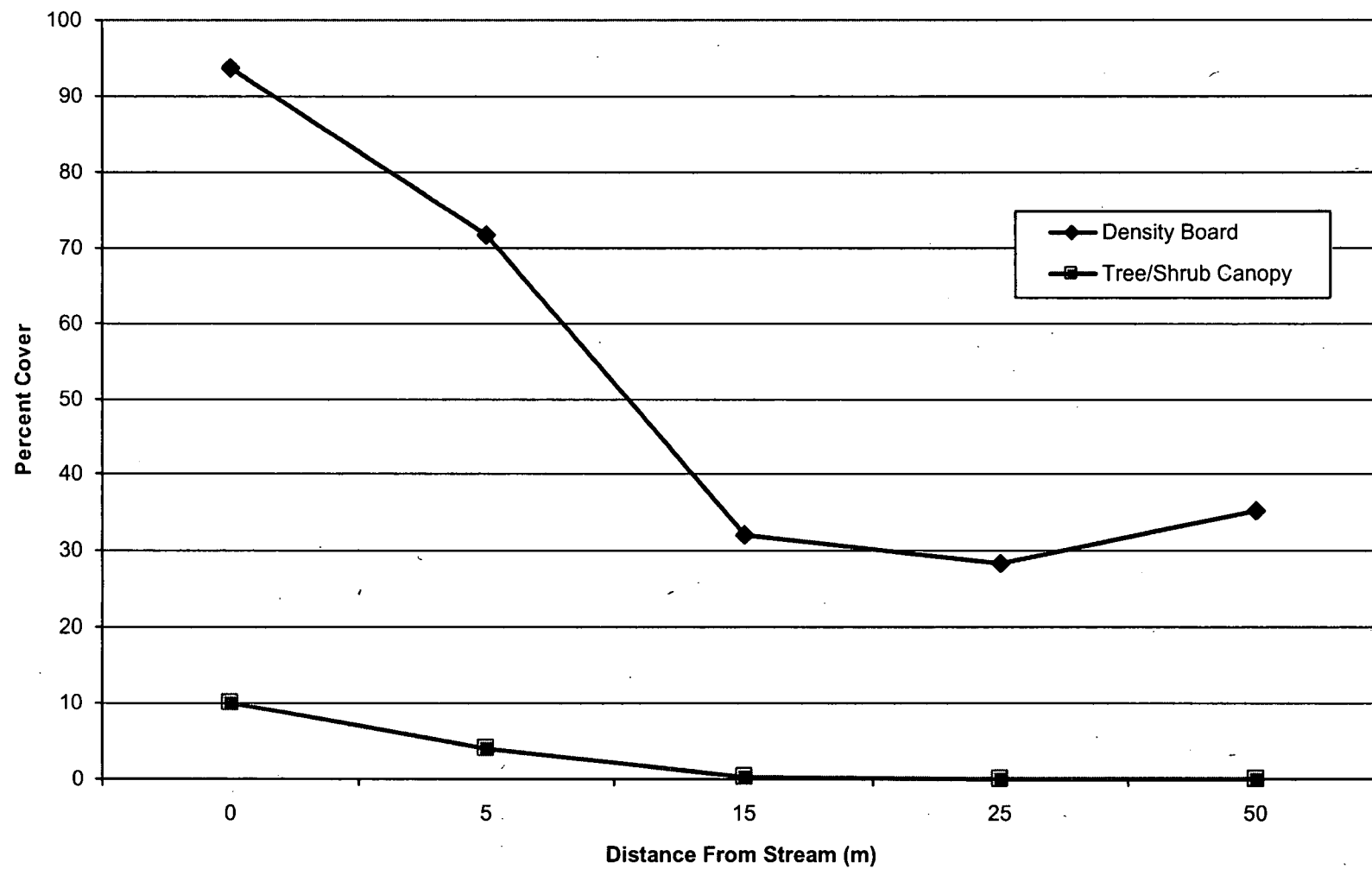


Figure 12. Herbaceous density board and tree/shrub canopy cover.